

**Beech Grove Water System Inc.  
445 Highway 56 N  
Calhoun KY 42327  
270 273-5738  
beechgrovewaters @bellsouth.net**

May 6, 2016

RECEIVED

Mr. Jeff Derouen  
Public Service Commission  
211 Sower Blvd  
PO Box 615  
Frankfort KY 40602

MAY 12 2016

Public Service  
Commission

CASE NO.  
2014-00306

RE: KAR 5:066, Section 5,  
Pressure Clarification

Mr. Derouen

Beech Grove Water System is requesting approval to revise the proposal to the four (4) meters that are in non-compliance with KAR 5:066.

Beech Grove Water System Board has voted to install booster pump station to increase the pressure to the four (4) meters. The specifications have been approved by the Division of Water.

If you have any questions or need additional information, please call 270 273-5738.

Sincerely,



Nathan Ward, President  
Beech Grove Water System

nw/sm

**Beech Grove Water System  
Purchased Water Adjustment  
Index**

- Exhibit A Letter from Division of Water & requirements**
- Exhibit B Specification for booster pump**
- Exhibit C Certification of Response**
- Exhibit D Water Board Minutes**
- Exhibit E Blue Prints**



MATTHEW G. BEVIN  
GOVERNOR

CHARLES G. SNAVELY  
SECRETARY

ENERGY AND ENVIRONMENT CABINET  
DEPARTMENT FOR ENVIRONMENTAL PROTECTION  
DIVISION OF WATER  
200 FAIR OAKS LANE, 4TH FLOOR  
FRANKFORT, KENTUCKY 40601  
[www.kentucky.gov](http://www.kentucky.gov)

April 5, 2016

Mr. Jeremy Rager  
Beech Grove Water System  
445 Hwy 56 N  
Calhoun, KY 42327

RE: Beech Grove Water System  
AI # 34006, APE20160001  
PWSID # 0750529-16-001  
KY-256 Booster Pump Station  
McLean County, KY

Dear Mr. Rager:

We have reviewed the plans and specifications for the above referenced project. The plans include the construction of approximately 300 LF of 2-inch PVC and a hydro-pneumatic booster pump station with two pumps capable of delivering 13 gpm at 115 feet of TDH and a 130 gallon hydro-pneumatic tank. This is to advise that plans and specifications for the above referenced project are APPROVED with respect to sanitary features of design, as of this date with the requirements contained in the attached construction permit.

For the purpose of review, DOW will not approve lines less than 3-inches for distribution. When lines less than 3-inches are proposed for distribution they are approved on a case-by-case basis with the stipulations that such cannot be extended. In area where lines may be extended in the future, DOW reserves the right to approve 3-inch waterlines as a minimum diameter.

Based on the hydraulic analysis submitted, the proposed waterlines are currently capable of maintaining 30 psi during a peak demand scenario. The utility shall not connect any additional customers to these waterlines if the system is not able to maintain 30 psi during peak demands. If you have any questions concerning this project, please contact Mr. Fred Sarabi at 502-564-3410 extension 4825.

Sincerely,

Terry Humphries, P.E.  
Supervisor, Engineering Section  
Water Infrastructure Branch  
Division of Water

TH:FS

Enclosures

C: Eclipse Engineers PLLC  
McLean County Health Department  
Division of Plumbing

## Distribution-Major Construction

Beech Grove Water System  
Facility Requirements

Activity ID No.: APE20160001

Page 1 of 13

**GACT0000000010 (KY-256 BPS) 1,000 LF of (1,1.25, 2) - inch HDPE, and 2 pumps; 13 gpm, 115 feet of TDH; 130 gallon Hydro-pneumatic tank**

### Narrative Requirements:

Condition No.	Condition
T-1	Construction of this project shall not result in the water system's inability to supply consistent water service in compliance with 401 KAR 8:010 through 8:600. [401 KAR 8:100 Section 5]
T-2	The public water system shall not implement a change to the approved plans without the prior written approval of the cabinet. [401 KAR 8:100 Section 4(3)]
T-3	A proposed change to the approved plans affecting sanitary features of design shall be submitted to the cabinet for approval in accordance with Section 2 of this administrative regulation. [401 KAR 8:100 Section 4(2)]
T-4	During construction, a set of approved plans and specifications shall be available at the job site. Construction shall be performed in accordance with the approved plans and specifications. [401 KAR 8:100 Section 3(1)]
T-5	Unless construction begins within two (2) years from the date of approval of the final plans and specifications, the approval shall expire. [401 KAR 8:100 Section 3(3)]
T-6	Upon completion of construction, a professional engineer shall certify in writing that the project has been completed in accordance with the approved plans and specifications. [401 KAR 8:100 Section 4(1)]
T-7	The system shall be designed to maintain a minimum pressure of 20 psi at ground level at all points in the distribution system under all conditions of flow. [Recommended Standards for Water Works 8.2.1, Drinking Water General Design Criteria IV.1.a]
T-8	Hydropneumatic (pressure) tanks, when provided as the only water storage are acceptable only for a maximum of 150 living units. [Recommended Standards for Water Works 7.2]
T-9	The tank shall be located above normal ground surface and be completely housed. [Recommended Standards for Water Works 7.2.1]
T-10	The capacity of the wells and pumps in a hydropneumatic system should be at least ten times the average daily consumption rate. [Recommended Standards for Water Works 7.2.2.a]

**Distribution-Major Construction**  
Beech Grove Water System  
Facility Requirements

Activity ID No.: APE20160001

GACT0000000010 (continued):

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Narrative Requirements:

Condition No.	Condition
T-11	The gross volume of the hydropneumatic tank, in gallons, should be at least ten times the capacity of the largest pump, rated in gallons per minute. For example, a 250 gpm pump should have a 2,500 gallon pressure tank, unless other measures (e.g., variable speed drives in conjunction with the pump motors) are provided to meet the maximum demand. [Recommended Standards for Water Works 7.2.2.b]
T-12	The hydropneumatic tank(s) shall have bypass piping to permit operation of the system while the tank is being repaired or painted. [Recommended Standards for Water Works 7.2.3]
T-13	Each tank shall have an access manhole, a drain, and control equipment consisting of a pressure gauge, water sight glass, automatic or manual air blow-off, means for adding air, and pressure operated start/stop controls for the pumps. [Recommended Standards for Water Works 7.2.4]
T-14	A pressure relief valve shall be installed and be capable of handling the full pumpage rate of flow at the pressure vessel design limit. [Recommended Standards for Water Works 7.2.4]
T-15	Sizing of hydropneumatic storage tanks must consider the need for disinfectant contact time. [Recommended Standards for Water Works 7.2.2.c]

**Distribution-Major Construction**  
Beech Grove Water System  
Facility Requirements

Activity ID No.: APE20160001

**PORT0000000009 (KY-256 BPS) 1,000 LF of (1,1.25, 2) - inch HDPE :**

**Narrative Requirements:**

Condition No.	Condition
T-1	Construction of this project shall not result in the water system's inability to supply consistent water service in compliance with 401 KAR 8:010 through 8:600. [401 KAR 8:100 Section 5]
T-2	The public water system shall not implement a change to the approved plans without the prior written approval of the cabinet. [401 KAR 8:100 Section 4(3)]
T-3	A proposed change to the approved plans affecting sanitary features of design shall be submitted to the cabinet for approval in accordance with Section 2 of this administrative regulation. [401 KAR 8:100 Section 4(2)]
T-4	During construction, a set of approved plans and specifications shall be available at the job site. Construction shall be performed in accordance with the approved plans and specifications. [401 KAR 8:100 Section 3(1)]
T-5	Unless construction begins within two (2) years from the date of approval of the final plans and specifications, the approval shall expire. [401 KAR 8:100 Section 3(3)]
T-6	Upon completion of construction, a professional engineer shall certify in writing that the project has been completed in accordance with the approved plans and specifications. [401 KAR 8:100 Section 4(1)]
T-7	The system shall be designed to maintain a minimum pressure of 20 psi at ground level at all points in the distribution system under all conditions of flow. [Recommended Standards for Water Works 8.2.1, Drinking Water General Design Criteria IV.1.a]
T-8	Water lines should be hydraulically capable of a flow velocity of 2.5 ft/s while maintaining a pressure of at least 20 psi. [Drinking Water General Design Criteria IV.1.b]
T-9	The normal working pressure in the distribution system at the service connection shall not be less than 30 psi under peak demand flow conditions. Peak demand is defined as the maximum customer water usage rate, expressed in gallons per minute (gpm), in the pressure zone of interest during a 24 hour (diurnal) time period. [Drinking Water General Design Criteria IV.1.d]
T-10	When static pressure exceeds 150 psi, pressure reducing devices shall be provided on mains or as part of the meter setting on individual service lines in the distribution system. [Drinking Water General Design Criteria IV.1.c]

**Distribution-Major Construction**  
Beech Grove Water System  
Facility Requirements

Activity ID No.: APE20160001

**PORT0000000009 (continued):**

**Narrative Requirements:**

Condition No.	Condition
T-11	The minimum size of water main in the distribution system where fire protection is not to be provided should be a minimum of three (3) inch diameter. Any departure from minimum requirements shall be justified by hydraulic analysis and future water use, and can be considered only in special circumstances. [Recommended Standards for Water Works 8.2.2, Drinking Water General Design Criteria IV.2.b]
T-12	Water mains not designed to carry fire-flows shall not have fire hydrants connected to them. [Recommended Standards for Water Works 8.4.1.b]
T-13	Flushing devices should be sized to provide flows which will give a velocity of at least 2.5 feet per second in the water main being flushed. [Recommended Standards for Water Works 8.2.4.b, Recommended Standards for Water Works 8.4.1.b]
T-14	No flushing device shall be directly connected to any sewer. [Recommended Standards for Water Works 8.2.4.b, Recommended Standards for Water Works 8.4.1.b]
T-15	Pipe shall be constructed to a depth providing a minimum cover of 30 inches to top of pipe. [Drinking Water General Design Criteria IV.3.a]
T-16	Water mains shall be covered with sufficient earth or other insulation to prevent freezing. [Recommended Standards for Water Works 8.7]
T-17	A continuous and uniform bedding shall be provided in the trench for all buried pipe. Backfill material shall be tamped in layers around the pipe and to a sufficient height above the pipe to adequately support and protect the pipe. Stones found in the trench shall be removed for a depth of at least six inches below the bottom of the pipe. [Recommended Standards for Water Works 8.7]
T-18	Water line installation shall incorporate the provisions of the AWWA standards and/or manufacturer's recommended installation procedures. [Recommended Standards for Water Works 8.7]
T-19	All materials used for the rehabilitation of water mains shall meet ANSI/NSF standards. [Recommended Standards for Water Works 8.1]
T-20	Packing and jointing materials used in the joints of pipe shall meet the standards of AWWA and the reviewing authority. [Recommended Standards for Water Works 8.1]
T-21	All tees, bends, plugs and hydrants shall be provided with reaction blocking, tie rods or joints designed to prevent movement. [Recommended Standards for Water Works 8.7]

## Distribution-Major Construction

Beech Grove Water System  
Facility Requirements

Activity ID No.: APE20160001

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PORT000000009 (continued):

### Narrative Requirements:

Condition No.	Condition
T-22	All materials including pipe, fittings, valves and fire hydrants shall conform to the latest standards issued by the ASTM, AWWA and ANSI/NSF, where such standards exist, and be acceptable to the Division of Water. [Recommended Standards for Water Works 8.1]
T-23	Water mains which have been used previously for conveying potable water may be reused provided they meet the above standards and have been restored practically to their original condition. [Recommended Standards for Water Works 8.1]
T-24	Manufacturer approved transition joints shall be used between dissimilar piping materials. [Recommended Standards for Water Works 8.1]
T-25	Pipes and pipe fittings containing more than 8% lead shall not be used. All products shall comply with ANSI/NSF standards. [Recommended Standards for Water Works 8.1]
T-26	The minimum size of water main which provides for fire protection and serving fire hydrants shall be six inch diameter. [Recommended Standards for Water Works 8.2, Drinking Water General Design Criteria IV.2.a]
T-27	Gaskets containing lead shall not be used. Repairs to lead joint pipe shall be made using alternative methods. [Recommended Standards for Water Works 8.1]
T-28	Pipe materials shall be selected to protect against both internal and external pipe corrosion. [Recommended Standards for Water Works 8.1]
T-29	Dead end mains shall be equipped with a means to provide adequate flushing. [Recommended Standards for Water Works 8.2]
T-30	The hydrant lead shall be a minimum of six inches in diameter. Auxiliary valves shall be installed on all hydrant leads. [Recommended Standards for Water Works 8.4.3]
T-31	A sufficient number of valves shall be provided on water mains to minimize inconvenience and sanitary hazards during repairs. [Recommended Standards for Water Works 8.3]
T-32	Wherever possible, chambers, pits or manholes containing valves, blowoffs, meters, or other such appurtenances to a distribution system, shall not be located in areas subject to flooding or in areas of high groundwater. Such chambers or pits should drain to the ground surface, or to absorption pits underground. The chambers, pits and manholes shall not connect directly to any storm drain or sanitary sewer. Blowoffs shall not connect directly to any storm drain or sanitary sewer. [Recommended Standards for Water Works 8.6]

**Distribution-Major Construction**

Beech Grove Water System

Facility Requirements

Activity ID No.: APE20160001

**PORT0000000009 (continued):**

**Narrative Requirements:**

Condition No.	Condition
T-33	At high points in water mains where air can accumulate provisions shall be made to remove the air by means of air relief valves. [Recommended Standards for Water Works 8.5.1]
T-34	Automatic air relief valves shall not be used in situations where flooding of the manhole or chamber may occur. [Recommended Standards for Water Works 8.5.1]
T-35	The open end of an air relief pipe from automatic valves shall be extended to at least one foot above grade and provided with a screened, downward-facing elbow. [Recommended Standards for Water Works 8.5.2.c]
T-36	Discharge piping from air relief valves shall not connect directly to any storm drain, storm sewer, or sanitary sewer. [Recommended Standards for Water Works 8.5.2.d]
T-37	Water pipe shall be constructed with a lateral separation of 10 feet or more from any gravity sanitary or combined sewer measured edge to edge where practical. If not practical a variance may be requested to allow the water pipe to be installed closer to the gravity sanitary or combined sewer provided the water pipe is laid in a separate trench or undisturbed shelf located on one side of the sewer with the bottom of the pipe at least 18 inches above the top of the gravity sanitary or combined sewer pipe. [Drinking Water General Design Criteria IV.3.b]
T-38	Water lines crossing sanitary, combined or storm sewers shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sanitary, combined or storm sewer with preference to the water main located above the sanitary, combined or storm sewer. [Drinking Water General Design Criteria IV.3.c]
T-39	At crossings, one full length of water pipe shall be located so both joints will be as far from the sewer as possible. [Recommended Standards for Water Works 8.8.3.b]
T-40	There shall be no connection between the distribution system and any pipes, pumps, hydrants, or tanks whereby unsafe water or other contaminating materials may be discharged or drawn into the system. [Recommended Standards for Water Works 8.10.1]
T-41	Water utilities shall have a cross connection program conforming to 401 KAR 8. [Recommended Standards for Water Works 8.10.1]
T-42	Installed pipe shall be pressure tested and leakage tested in accordance with the appropriate AWWA Standards. [Recommended Standards for Water Works 8.7.6]

**Distribution-Major Construction**

Beech Grove Water System  
Facility Requirements

Activity ID No.: APE20160001

**PORT0000000009 (continued):**

**Narrative Requirements:**

Condition No.	Condition
T-43	New, cleaned and repaired water mains shall be disinfected in accordance with AWWA Standard C651. The specifications shall include detailed procedures for the adequate flushing, disinfection, and microbiological testing of all water mains. In an emergency or unusual situation, the disinfection procedure shall be discussed with the Division of Water. [Recommended Standards for Water Works 8.7.7]
T-44	A minimum cover of five feet shall be provided over pipe crossing underwater. [Recommended Standards for Water Works 8.9.2]
T-45	Valves shall be provided at both ends of water crossings so that the section can be isolated for testing or repair; the valves shall be easily accessible, and not subject to flooding for pipes crossing underwater. [Recommended Standards for Water Works 8.9.2.b]
T-46	Permanent taps or other provisions to allow insertion of a small meter to determine leakage and obtain water samples on each side of the valve closest to the supply source for pipes crossing. [Recommended Standards for Water Works 8.9.2.c]

## Distribution-Major Construction

Beech Grove Water System  
Facility Requirements

Activity ID No.: APE20160001

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### PORT000000010 (Booster Pump Station) 2 pumps; 13 gpm; 115 feet of TDH:

#### Narrative Requirements:

Condition No.	Condition
T-1	Construction of this project shall not result in the water system's inability to supply consistent water service in compliance with 401 KAR 8:010 through 8:600. [401 KAR 8:100 Section 5]
T-2	The public water system shall not implement a change to the approved plans without the prior written approval of the cabinet. [401 KAR 8:100 Section 4(3)]
T-3	A proposed change to the approved plans affecting sanitary features of design shall be submitted to the cabinet for approval in accordance with Section 2 of this administrative regulation. [401 KAR 8:100 Section 4(2)]
T-4	During construction, a set of approved plans and specifications shall be available at the job site. Construction shall be performed in accordance with the approved plans and specifications. [401 KAR 8:100 Section 3(1)]
T-5	Unless construction begins within two (2) years from the date of approval of the final plans and specifications, the approval shall expire. [401 KAR 8:100 Section 3(3)]
T-6	Upon completion of construction, a professional engineer shall certify in writing that the project has been completed in accordance with the approved plans and specifications. [401 KAR 8:100 Section 4(1)]
T-7	The system shall be designed to maintain a minimum pressure of 20 psi at ground level at all points in the distribution system under all conditions of flow. [Recommended Standards for Water Works 8.2.1, Drinking Water General Design Criteria IV.1.a]
T-8	Pumping facilities shall be elevated to a minimum of three feet above the 100-year flood elevation, or three feet above the highest recorded flood elevation, whichever is higher, or protected to such elevations, [Recommended Standards for Water Works 6.1.1.a]
T-9	Pumping facilities shall be readily accessible at all times. [Recommended Standards for Water Works 6.1.1.b]
T-10	Pumping facilities shall be graded around the station so as to lead surface drainage away from the station. [Recommended Standards for Water Works 6.1.1.c]
T-11	Pumping facilities shall be protected to prevent vandalism and entrance by animals or unauthorized persons. [Recommended Standards for Water Works 6.1.1.d]
T-12	Raw and finished pump stations shall have adequate space for the installation of additional units if needed, and for the safe servicing of all equipment. [Recommended Standards for Water Works 6.2.a]

## Distribution-Major Construction

Beech Grove Water System  
Facility Requirements

Activity ID No.: APE20160001

PORT0000000010 (continued):

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### Narrative Requirements:

Condition No.	Condition
T-13	Raw and finished pump stations shall have floors that slope to a suitable drain. [Recommended Standards for Water Works 6.2.c]
T-14	Raw and finished pump stations shall provide a suitable outlet for drainage from pump glands without discharging onto the floor. [Recommended Standards for Water Works 6.2.f]
T-15	At least two pumping units shall be provided. With any pump out of service, the remaining pump or pumps shall be capable of providing the maximum pumping demand of the system. [Recommended Standards for Water Works 6.3]
T-16	Pumps shall have ample capacity to supply the peak demand against the required distribution system pressure without dangerous overloading. [Recommended Standards for Water Works 6.3.a]
T-17	Pumps shall be driven by prime movers able to meet the maximum horsepower condition of the pumps. [Recommended Standards for Water Works 6.3.b]
T-18	Pumps shall be provided with readily available spare parts and tools. [Recommended Standards for Water Works 6.3.c]
T-19	Pump stations shall have indicating, totalizing, and recording metering of the total water pumped. [Recommended Standards for Water Works 6.6.3]
T-20	Each pump shall have a standard pressure gauge on its discharge line. [Recommended Standards for Water Works 6.6.3.a]
T-21	Each pump shall have a compound gauge on its suction line. [Recommended Standards for Water Works 6.6.3.b]
T-22	Where two or more pumps are installed, provision shall be made for alternation. [Recommended Standards for Water Works 6.6.5]
T-23	Provisions shall be made to prevent energizing the pump motor in the event of a backspin cycle. [Recommended Standards for Water Works 6.6.5]
T-24	Electrical controls shall be located above grade. [Recommended Standards for Water Works 6.6.5]
T-25	Equipment shall be provided or other arrangements made to prevent surge pressures from activating controls which switch on pumps or activate other equipment outside the normal design cycle of operation. [Recommended Standards for Water Works 6.6.5]

**Distribution-Major Construction**  
Beech Grove Water System  
Facility Requirements

Activity ID No.: APE20160001

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**PORT000000010 (continued):**

**Narrative Requirements:**

Condition No.	Condition
T-26	Pump stations shall have a power supply provided from at least two independent sources or a standby or an auxiliary source. [Recommended Standards for Water Works 6.6.6]
T-27	If standby power is provided by onsite generators or engines, the fuel storage and fuel line must be designed to protect the water supply from contamination. [Recommended Standards for Water Works 6.6.6]
T-28	All lubricants which come into contact with the potable water shall be certified for conformance to ANSI/NSF Standard 60. [Recommended Standards for Water Works 6.6.8]
T-29	Booster pumps stations shall have a bypass available. [Recommended Standards for Water Works 6.4.c]
T-30	Each booster pumping station shall contain not less than two pumps with capacities such that peak demand can be satisfied with the largest pump out of service. [Recommended Standards for Water Works 6.4.1]
T-31	All booster pumping stations shall be fitted with a flow rate indicating and totalizer meter. [Recommended Standards for Water Works 6.4.2]
T-32	Inline booster pumps shall be accessible for servicing and repairs. [Recommended Standards for Water Works 6.4.3]
T-33	Each pump must have an isolation valve on the intake and discharge side of the pump to permit satisfactory operation, maintenance and repair of the equipment. [Recommended Standards for Water Works 6.6.1]
T-34	Each pump shall have a positive acting check valve on the discharge side between the pump and the shut-off valve. [Recommended Standards for Water Works 6.6.1]
T-35	Pump station piping shall be designed so that the friction losses will be minimized, not be subject to contamination, have watertight joints, be protected against surge or water hammer with suitable restraints when necessary, and be such that each pump has an individual suction line or the lines shall be manifolded that they will insure similar hydraulic and operating conditions. [Recommended Standards for Water Works 6.6.2]
T-36	Booster pumps taking suction from storage tanks shall be provided adequate net positive suction head. [Recommended Standards for Water Works 6.4.b]

**Distribution-Major Construction**

Beech Grove Water System

Facility Requirements

Activity ID No.: APE20160001

**PORT0000000010 (continued):**

**Narrative Requirements:**

Condition No.	Condition
T-37	Booster pumps shall controlled so that automatic shutoff or low pressure controllers maintain at least 20 psi in the suction line under all operating conditions. [Recommended Standards for Water Works 6.4.c]
T-38	Booster pumps taking suction from ground storage tanks shall be equipped with automatic shutoffs or low pressure controllers. [Recommended Standards for Water Works 6.4.c]
T-39	All automatic pump stations should be provided with automatic signaling apparatus which will report when the station is out of service. [Recommended Standards for Water Works 6.5]
T-40	All remote controlled stations shall be electrically operated and controlled and shall have signaling apparatus of proven performance. [Recommended Standards for Water Works 6.5]
T-41	Raw and finished pump stations shall have a floor elevation of at least six inches above finished grade. [Recommended Standards for Water Works 6.2.c]

## Distribution-Major Construction

Beech Grove Water System  
Facility Requirements

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**STOR0000000002 (bladder tank) 130 gallons:**

### Narrative Requirements:

Condition No.	Condition
T-1	Construction of this project shall not result in the water system's inability to supply consistent water service in compliance with 401 KAR 8:010 through 8:600. [401 KAR 8:100 Section 5]
T-2	The public water system shall not implement a change to the approved plans without the prior written approval of the cabinet. [401 KAR 8:100 Section 4(3)]
T-3	A proposed change to the approved plans affecting sanitary features of design shall be submitted to the cabinet for approval in accordance with Section 2 of this administrative regulation. [401 KAR 8:100 Section 4(2)]
T-4	During construction, a set of approved plans and specifications shall be available at the job site. Construction shall be performed in accordance with the approved plans and specifications. [401 KAR 8:100 Section 3(1)]
T-5	Unless construction begins within two (2) years from the date of approval of the final plans and specifications, the approval shall expire. [401 KAR 8:100 Section 3(3)]
T-6	Upon completion of construction, a professional engineer shall certify in writing that the project has been completed in accordance with the approved plans and specifications. [401 KAR 8:100 Section 4(1)]
T-7	The system shall be designed to maintain a minimum pressure of 20 psi at ground level at all points in the distribution system under all conditions of flow. [Recommended Standards for Water Works 8.2.1, Drinking Water General Design Criteria IV.1.a]
T-8	Hydropneumatic (pressure) tanks, when provided as the only water storage are acceptable only for a maximum of 150 living units. [Recommended Standards for Water Works 7.2]
T-9	The tank shall be located above normal ground surface and be completely housed. [Recommended Standards for Water Works 7.2.1]
T-10	The capacity of the wells and pumps in a hydropneumatic system should be at least ten times the average daily consumption rate. [Recommended Standards for Water Works 7.2.2.a]
T-11	The gross volume of the hydropneumatic tank, in gallons, should be at least ten times the capacity of the largest pump, rated in gallons per minute. For example, a 250 gpm pump should have a 2,500 gallon pressure tank, unless other measures (e.g., variable speed drives in conjunction with the pump motors) are provided to meet the maximum demand. [Recommended Standards for Water Works 7.2.2.b]

**Distribution-Major Construction**  
Beech Grove Water System  
Facility Requirements

Activity ID No.: APE20160001

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FOR0000000002 (continued):

Narrative Requirements:

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Condition No.	Condition
T-12	The hydropneumatic tank(s) shall have bypass piping to permit operation of the system while the tank is being repaired or painted. [Recommended Standards for Water Works 7.2.3]
T-13	Each tank shall have an access manhole, a drain, and control equipment consisting of a pressure gauge, water sight glass, automatic or manual air blow-off, means for adding air, and pressure operated start/stop controls for the pumps. [Recommended Standards for Water Works 7.2.4]
T-14	A pressure relief valve shall be installed and be capable of handling the full pumpage rate of flow at the pressure vessel design limit. [Recommended Standards for Water Works 7.2.4]
T-15	Sizing of hydropneumatic storage tanks must consider the need for disinfectant contact time. [Recommended Standards for Water Works 7.2.2.c]

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# Specifications

for:

## KY 256 Booster Pump Station

**Beech Grove Water System  
445 Highway 56 North  
Calhoun, Kentucky 42327**

**March 2016**

*Prepared by:*



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## SECTION 00700 - GENERAL CONDITIONS

### PART I - GENERAL

#### 1.01 CONTRACT DOCUMENTS

The Advertisement for Bids, Instructions to Bidders, Bidder's Proposal, Bid Bond, Agreement, Performance and Payment Bonds, Certificate of Insurance, Notice of Award, Notice to Proceed, Change Orders, General Conditions, Supplementary General Conditions, Special Conditions, Drawings, Addenda and Specifications shall all be binding on the Contractor, and shall be fully a part of the Contract as if thereto attached or therein repeated in words and figures.

#### 1.02 DEFINITIONS AND MEANINGS OF TERMS

Whenever in the Contract Documents the following terms or pronouns referring to them are used, the intent and meaning shall be interpreted as follows which shall be applicable to both the singular and plural thereof:

- A. The Contract shall mean the Contract executed by the OWNER and the Contractor, of which these General Conditions form a part; the terms Contract and Agreement are synonymous.
- B. The terms OWNER and Contractor shall mean the respective parties to the Contract; the OWNER being a public or quasi-public body or authority, corporation, association, partnership, or individual for whom the work is to be performed; the Contractor being the individual, partnership or corporation with whom the OWNER has executed the Contract.
- C. The term Engineer shall mean Eclipse Engineers, PLLC, successor, or duly authorized representative.
- D. Addenda shall mean written or graphic instruments issued prior to the execution of the Agreement, which modify or interpret the Contract Documents, Drawings and Specifications, by additions, deletions, clarifications or corrections.
- E. Bid shall mean the offer or proposal of the BIDDER submitted on the prescribed form setting forth the prices for the Work to be performed; the terms Bid and Proposal are synonymous.
- F. BIDDER shall mean any individual, partnership or corporation submitting a Bid for the Work.

- S. Specifications shall mean a part of the Contract Documents consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.
- T. Subcontractor shall mean individual, partnership or corporation having a direct contract with the Contractor or with any other subcontractor for the performance of a part of the Work at the site.
- U. Substantial completion shall mean that date as certified by the Engineer when the construction of the project or a specified part thereof is sufficiently completed, in accordance with the Contract Documents, so that the project or specified part can be utilized for the purposes for which it is intended.
- V. Suppliers shall mean any person, supplier or organization who supplies materials or equipment for the Work, including that fabricated to a special design, but who does not perform labor at the site.
- W. Work shall mean labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in the project.
- X. Written notice shall mean any notice to any party of the Agreement relative to any part of this Agreement in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at his last given address, or delivered in person to said party of his authorized representative on the Work.

### 1.03 DRAWINGS AND SPECIFICATIONS

The intent of the Drawings and Specifications is that the Contractor shall furnish all labor, materials, tools, equipment, and transportation necessary for the proper execution of the Work in accordance with the Contract Documents and all incidental work necessary to complete the project in an acceptable manner, ready for use, occupancy or operation by the OWNER.

The Engineer, without charge, will furnish to the Contractor not more than three (3) sets of the Drawings and Specifications. If additional sets of documents are required by the Contractor for the proper handling of the work, such documents will be furnished to the Contractor at cost.

The Contractor shall keep one set of the Drawings and Specifications on the site of the work. This set shall be kept current by the addition of all reviewed changes, addenda and amendments thereto.

The Contractor shall be responsible for the prompt and timely submittal of all shop and working drawings so that there shall be no delay to the Work due to the absence of such drawings. Prior to the submittal of any shop drawings, the Contractor shall submit a schedule of proposed shop drawing transmittals. The schedule shall identify the subject matter of each transmittal, the corresponding specification section number and the proposed date of submission. During the progress of the Work, the schedule shall be revised and resubmitted as necessary.

No material or equipment shall be purchased or fabricated especially for the Contract until the required shop and working drawings have been submitted as herein above provided and reviewed for conformance to the Contract requirements. All such materials and equipment and the work involved in their installation or incorporation into the Work shall then be as shown in and represented by said drawings. Until the necessary review has been made, the Contractor shall not proceed with any portion of the Work (such as the construction of foundations), the design or details of work, materials, equipment or other features for which review is required.

All shop and working drawings shall be submitted to the Engineer by and/or through the Contractor, who shall be responsible for obtaining shop and working drawings from his subcontractors and returning reviewed drawings to them. All shop and working drawings shall be prepared on standard size, 24-inch by 36-inch sheets, except those, which are made by changing existing standard shop or working drawings. All drawings shall be clearly marked with the names of the OWNER, Contractor, and building, equipment, or structure to which the drawing applies, and shall be suitably numbered. Each shipment of drawings shall be accompanied by a letter of transmittal giving a list of the Drawing numbers and the names mentioned above.

Only drawings, which have been checked and corrected by the fabricator, should be submitted to the Contractor by his subcontractors and vendors. Prior to submitting drawings to the Engineer, the Contractor shall check thoroughly all such drawings to satisfy him that the subject matter thereof conforms to the Drawings and Specifications in all respects. All Drawings, which are correct, shall be marked with the date, checker's name, and indication of the Contractor's approval, and then shall be submitted to the Engineer; other drawings shall be returned for correction.

If a shop drawing shows any deviation from the Contract requirements, the Contractor shall make specific mention of the deviations in his letter of transmittal.

The review of shop and working drawings hereunder will be general only, and nothing contained in these general conditions shall relieve, diminish or alter in any respect the responsibilities of the Contractor under the Contract Documents and in particular, the specific responsibility of the Contractor for details of design and dimensions necessary for proper fitting and construction of the work as required by the Contract and for achieving the result and performance specified there under.

Should the Contractor submit equipment that requires modifications to the structures,

matters which in any way affect the work under the Contract. No verbal statement of any officer, agent or employee of the OWNER or the Engineer, either before or after the execution of the Contract, shall affect or modify any of the terms or obligations contained herein.

#### 1.07 NOTICE AND SERVICE THEREOF ON CONTRACTOR

The address given in the Proposal upon which this Contract is founded and the Contractor's office at or near the site of the work are hereby designated as places to either of which notices, letters and other communications to the Contractor shall be certified, mailed or delivered. The delivering at the above name places, or depositing in a postpaid wrapper directed to the first named place, in any post office box regularly maintained by the United States Postal Service, of any notice, letter or other communication to the Contractor shall be deemed sufficient service thereof upon the Contractor, and the date of said service shall be the date of delivery or mailing. The first named address may be changed at any time by an instruction in writing, executed and acknowledged by the Contractor and delivered to the Engineer and the OWNER. Nothing herein contained shall be deemed to preclude or render inoperative the service of any notice, letter, or other communication upon the Contractor personally.

#### 1.08 ASSIGNMENT OF CONTRACT

The Contractor shall not assign, sell, transfer or otherwise dispose of his Contract or any monies due or that may become due there under, without the prior written consent of the OWNER.

#### 1.09 SUBLETTING CONTRACT

The Contractor may utilize the services of specialty subcontractors on those parts of the Work, which, under contracting practices, are performed, by specialty subcontractors. However, the Contractor will not be permitted to sublet any portion of his contract to any individual, co-partnership, or corporation without the prior written consent of the OWNER and the approval of the Engineer. The Contractor shall not sublet more than fifty percent (50%) of the work without the consent of the OWNER and the approval of the Engineer prior to the receipt of Bids. The Contractor shall, if requested, notify the OWNER in writing of the names of subcontractors proposed for the work.

The Contractor shall be as fully responsible to the OWNER for the acts and omissions of his subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind subcontractors to the Contractor by the terms of the General Conditions and other Contract Documents insofar as applicable to the work of

additions in monetary value bears to the original Contract amount. Delays caused by normal and ordinary weather conditions foreseeable at the time the work is Bid will not be the basis for an extension of the Contract time.

If the Contractor claims that any instructions by Drawings or otherwise involve an extension of time, he shall give the Engineer written notice of said claim within ten (10) consecutive calendar days after the receipt of such instructions, and in any event before proceeding to execute the work, stating clearly and in detail the basis of his claim or claims. No such claim shall be valid unless so made.

The Contractor shall make no claim for extra compensation due to delays of the project beyond his control. Such delays may include those caused by any act of neglect on the part of the OWNER or Engineer, or by any employee of either, or by any separate contractor employed by the OWNER, or by changes ordered in the work, or by labor disputes, fire, unusual delays in transportation, adverse weather conditions not reasonably anticipated, unavoidable casualties, or by delay authorized by the OWNER pending arbitration, or by any other cause which the Engineer determines may justify the delay.

Time extensions may be granted upon proper justification by the Contractor. Any claim for time extensions under these provisions shall be submitted in writing to the Engineer not more than twenty (20) consecutive calendar days following commencement of the delay; otherwise claim will be waived. With submission of claim, Contractor shall provide an estimate of the probable effect of such delay on the progress of the work.

Additional costs incurred in accelerating the work to compensate for such delays (as defined above) shall also not form the basis for extra compensation claims.

#### 1.13 FAILURE TO COMPLETE WORK ON TIME

Should the Contractor fail or refuse to complete the work within the time specified in his Proposal and/or Contract (or extension of time granted by the OWNER), the Contractor shall pay liquidated damages in an amount set out in said Proposal and/or Contract. The amount of liquidated damages shall in no event be considered as a penalty, nor other than an amount agreed upon by the Contractor and the OWNER for damages, losses, additional engineering, additional resident representation and other costs that will be sustained by the OWNER, if the Contractor fails to complete the work within the specified time. Liquidated damages will be applied on a rate per day for each and every calendar day (Sundays and holidays included) beyond the Contract expiration date stipulated in the Contract Documents, considering all time extensions granted.

Should no liquidated damages amount be specified in the Proposal and/or Contract,

under a conditional sale contract or other agreement by which an interest is retained by the seller.

Review of manufacturer's shop drawings of materials and equipment shall not mean final acceptance, but shall be subject to review and test on delivery and installation. The Contractor shall repair, replace, or adjust any materials or equipment found defective or not operating properly due to improper materials, workmanship, and adjustment on his part, for a period of one year after completion and acceptance of his work.

#### 1.15 ENGINEER'S STATUS

In rendering general engineering service, resident engineering and review of construction, the Engineer is not in charge of, and shall not be responsible for, the methods of construction, the construction forces or the construction equipment, construction safety procedures, or Contractor payment for labor and materials on the project.

The Engineer may review the work as the authorized representative of the OWNER and will have authority to stop the work whenever, in his opinion, such action is necessary to insure the proper execution of the Contract. He will also have authority to reject work and materials, which do not conform to the Drawings, Specifications and Contract Documents, and to direct the place or places where work shall be prosecuted. The Engineer is the agent of the OWNER only to the extent provided in the Specifications and Contract Documents, except in special instances when this authority is extended; in such latter instances he will, upon request, show the Contractor written proof of his authority.

The Engineer will also interpret the meaning and requirements of the Drawings, Specification and Contract Documents, decide all engineering questions, and decide all disputes that may arise between the OWNER and the Contractor. The Engineer's decisions on these matters will be final and binding on both the Contractor and the OWNER unless the dispute is submitted to arbitration or either party resorts to legal action for settlement.

The Engineer is the interpreter of the conditions of the Contract and the judge of its performance. In this duty, he will not favor either the OWNER or the Contractor but will use his authority under the Contract to insure and enforce its faithful performance by both parties.

In case of the termination of the employment of the Engineer, the OWNER will appoint a capable and reputable Engineer, whose status under the Contract will be the same as that of the former Engineer; any dispute in connection with such appointment shall be

construed to mean the latest amended and/or revised versions of the said standard or tentative specification.

#### 1.20 SPECIFIC BRANDS, MAKES OR MANUFACTURERS

Wherever in the Specifications one or more specific brands, makes or manufacturers are set out and qualified by the "or equal" clause, it is intended to denote the quality standard of the article desired, but unless otherwise noted does not restrict the Contractor to the specific brand, make or manufacturer. In cases where one or more specific brands, makes or manufacturers are named and these names are not qualified by the "or equal" clause, it is intended that the Contractor be restricted to one of those named unless otherwise set out.

The Contractor may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the Specifications by reference to brand name or catalogue number, and if, in the opinion of the Engineer, such material, article, or piece of equipment is of equal substance and function to that specified, the Engineer may accept its substitution and use by the Contractor. Any cost differential shall be deductible from the Contract price and the Contract Documents shall be appropriately modified by Change Order. The Contractor warrants that if substitutes are accepted, no major changes in the function or general design of the Project will result. Incidental changes or extra component parts required to accommodate the substitute shall be made by the Contractor without a change in the Contract price or Contract time.

#### 1.21 "OR EQUAL" CLAUSE

Whenever the words "or approved equal", or "or equal", or "similar to", etc., appear in the Specifications, they shall be interpreted to mean an item of material or equipment that, in the opinion of the Engineer is similar to that named, suited to the same use, capable of performing the same function as that named, has a record of service equal to that named, and is equal in quality, capacity and/or efficiency to that named.

The Engineer's decision as to the equality of any material or equipment to that specified shall be final, but acceptance by the Engineer shall not relieve the Contractor from his responsibility concerning such materials or equipment or affect the guarantee covering the workmanship, materials and equipment.

#### 1.22 PERMITS AND CODES

Unless otherwise set out in the Specifications or required by the agencies involved, the Contractor shall make application for, obtain and pay for all licenses and permits of a temporary nature necessary for the prosecution of the Work and shall pay for all fees and charges in connection therewith. Permits, licenses and easements for permanent structures or permanent changes in existing facilities will be secured and paid for by the

on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular 570. Each Bond shall be in the amount not less than one hundred percent (100%) of the Contract price, as security for the faithful performance of this Contract and as security for the payment of all persons performing labor and furnishing materials in connection with this Contract. These Bonds must be executed in the form provided as a part of the Contract Documents, and the surety company shall hold a current certificate of authority, as issued by the Treasury Department, as an acceptable surety on Federal Bonds under an act of Congress approved July 30, 1947. The expense of these Bonds shall be borne by the Contractor.

If at any time a surety on any such Bond is declared bankrupt or loses its right to do business in the state in which the Work is to be performed or is removed from the list of Surety Companies acceptable on Federal Bonds, the Contractor shall within ten (10) consecutive calendar days after notice from the OWNER to do so, substitute an acceptable Bond (or Bonds) in such form and sum and signed by such other surety or sureties as may be satisfactory to the OWNER. The Contractor shall pay the premiums on such Bond. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable bond to the OWNER.

#### 1.26 SAFETY

The Contractor shall take all necessary precautions and provide all necessary safeguards to prevent personal injury and property damage. The Contractor shall provide protection for all persons including but not limited to his employees and employees of other contractors or subcontractors; members of the public; and employees, agents, and representatives of the OWNER, the Engineer, and regulatory agencies that may be on or about the Work. The Contractor shall provide protection for all public and private property including but not limited to structures, pipes, and utilities, above and below ground.

The Contractor shall provide and maintain all necessary safety equipment such as fences, barriers, signs, lights, walkways, guards and fire prevention and fire-fighting equipment and shall take such other action as is required to fulfill his obligations under this subsection.

The Contractor shall comply with all federal, state and local laws, ordinances, rules and regulations and lawful orders of all authorities having jurisdiction for the safety of persons and protection of property.

The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This responsible person shall have the authority to take immediate action to correct unsafe or hazardous conditions and to enforce safety precautions and programs.

operations be by him or by any subcontractor, or by anyone directly or indirectly employed by either of them.

Where work on railroad rights-of-way is involved, the Contractor shall also be covered by Railroad Protective Liability Insurance with limits of liability as required by the railroad company on whose property the work is being performed.

### 1.30 INSURANCE, BUILDERS RISK

The Contractor shall provide Builders Risk Insurance (fire and extended coverage) on all work in place and/or materials stored at the site where there is any considerable risk from such causes for damage. Such insurance shall provide coverage as set forth in Paragraph 1.31 hereinafter. The policy shall name as the insured the Contractor, the Engineer and the OWNER.

### 1.31 MINIMUM INSURANCE LIMITS

The minimum amounts of insurance to be furnished by and for the Contractor and the subcontractors, and for the OWNER as a named insured, under this Contract are:

#### A. Workmen's Compensation:

1. Applicable state statutes.
2. Employers Liability = \$100,000 limit of liability.

#### B. Commercial General Liability:

1. Coverage A - Bodily Injury Liability and Property Damage:
  - a. General Policy Aggregate = \$1,000,000.
  - b. Products - Completed Operations Aggregate = \$1,000,000.
  - c. Each Occurrence = \$500,000.
2. Coverage B - Personal and Advertising Injury Liability = \$1,000,000.

#### C. Comprehensive Automobile Liability:

1. Bodily Injury Liability:
  - a. \$500,000 each person.
  - b. \$1,000,000 each accident.

due the said Contractor under and by virtue of his Contract as shall be considered necessary by the OWNER may be retained for the use of the OWNER, or in case no money is due, his surety shall be held until such suit or suits, action or actions, claim or claims for injuries or damages as aforesaid, shall have been settled and suitable evidence to that effect furnished to the OWNER. Contractor shall purchase public liability, workers compensation and automobile liability insurance, for OWNER'S protection in the amounts set forth in Paragraph 1.31.

In any and all claims against the OWNER or the Engineer, or any of their agents or employees, by any employee of the Contractor, and subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any subcontractor under Workmen's Compensation acts, disability benefit acts or other employee benefit acts.

The obligation of the Contractor under this paragraph shall not extend to the liability of the Engineer, his agents or employees arising out of the preparation or approval of maps, Drawings, opinions, reports, surveys, Change Orders, designs or Specifications.

#### 1.35 HANDLING AND DISTRIBUTION

The Contractor shall handle, haul, and distribute all materials and all surplus materials on the different portions of the Work, as necessary or required; shall provide suitable and adequate storage room for materials and equipment during the progress of the Work; and shall be responsible for the protection, loss of, or damage to materials and equipment furnished by him, until the final completion and acceptance of the Work.

Storage and demurrage charges by transportation companies and vendors shall be borne by the Contractor.

#### 1.36 MATERIALS - SAMPLES - REVIEW

Unless otherwise expressly provided on the Drawings or in any of the other Contract Documents, only new materials and equipment shall be incorporated in the Work. All materials and equipment furnished by the Contractor to be incorporated in the Work shall be subject to the review of the Engineer. No material shall be processed or fabricated for the Work or delivered to the Work site without prior concurrence of the Engineer.

As soon as possible after execution of the Agreement, the Contractor shall submit to the Engineer the names and addresses of the manufacturers and suppliers of all materials and equipment he proposes to incorporate into the Work. When shop and working drawings are required as specified below, the Contractor shall submit prior to the submission of such drawings, data in sufficient detail to enable the Engineer to

percentage of retainage applicable to payment for completed work, upon specific recommendation of the Engineer. Such payment shall be conditional upon submission by the Contractor of bills of sale of such other procedure as will establish the OWNER'S title to such material or otherwise adequately protect the OWNER'S interest.

Only durable materials and equipment, which in the opinion of the Engineer have been properly stored and protected shall be included in materials, furnished in partial payment estimates. Clay pipe, brick and tile will be excluded. In the interest of simplification of checking and bookkeeping, miscellaneous supplies will also be excluded.

#### 1.38 MATERIALS

- A. Materials, Domestic and Foreign Manufacture: Unless otherwise specified, only such non-manufactured articles, materials and supplies as have been mined or produced in the United States of America, and only such manufactured articles, materials and supplies as have been manufactured in the United States of America substantially all from articles, materials, or supplies mined, produced, or manufactured--as the case may be--in the United States of America, shall be employed under this Contract in the construction of the Project.
- B. Materials, Convict Manufacture: No materials manufactured or produced in a penal or correctional institution shall be incorporated in the Work under this Contract.

#### 1.39 DEFECTIVE MATERIALS AND WORKMANSHIP

Materials brought to the site which are not in accordance with the Specifications shall be removed from the site of the Work by the Contractor at his own expense. Such material shall be so disposed of that there will be no probability of their being used on the work or in the construction.

Upon notice from the Engineer, the Contractor, at his own expense, shall immediately remedy all defective workmanship.

If the Contractor fails to remove defective materials or to correct defective workmanship within a reasonable time, fixed in the notice from the Engineer, the OWNER may remove the defective materials and/or correct the defective work and charge all the expense in connection therewith to the Contractor.

#### 1.40 GUARANTY

The Contractor shall guarantee all materials and equipment furnished and Work performed for a period of one (1) year from the date of Substantial Completion. The Contractor warrants and guarantees for a period of one (1) year from the date of

in work on the Project in full (less deductions made mandatory by law) in cash or by check once each week.

#### 1.46 SCHEDULES, REPORTS AND RECORDS

The Contractor shall submit to the OWNER such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data as the OWNER may request concerning Work performed or to be performed.

When required, the Contractor shall furnish the OWNER with proof that all payrolls for services rendered and invoices for materials or equipment supplied have been duly paid. The Contractor shall provide all such other data as the Engineer and/or OWNER may require.

In connection with all lump sum contracts or lump sum portions of unit price contracts, the Contractor shall furnish the Engineer a detailed breakdown on which to base partial payment estimates. The detailed breakdown shall be subject to review by the Engineer.

The Contractor shall furnish and keep current a progress chart or schedule showing the estimated and actual progress of the Work. The progress chart or schedule shall be subject to review by the Engineer.

The Contractor shall furnish all the necessary information for and assist in the preparation of, and/or prepare the partial payment estimates on forms furnished by the Engineer.

#### 1.47 PLANNING AND PROGRESS SCHEDULES

Before starting the Work and from time to time (at least once per month) during its progress, as the Engineer may request, the Contractor shall submit to the Engineer a written description of the methods he plans to use in doing the Work and the various steps he intends to take. Within fifteen (15) consecutive calendar days after the date of formal execution of the Agreement, the Contractor shall prepare and submit to the Engineer: (a) a written schedule fixing the dates on which additional drawings, if any, will be needed by the Contractor; and (b) a written schedule fixing the respective dates for the start and completion of various parts of the Work. Each such schedule shall be subject to review from time to time during the progress of the Work.

The Contractor shall also submit a schedule of payments that he anticipates he will earn during the course of the Work.

The OWNER, or his authorized representatives and agents, shall be permitted to inspect all payroll, records of personnel, invoices for materials or equipment and other relevant data and records.

be supported by such data as the Engineer may reasonably require. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to the OWNER, as will establish the OWNER'S title to the material and equipment and protect his interest therein, including applicable insurance. The Engineer will, within ten (10) consecutive calendar days after receipt of each partial payment estimate, either indicate in writing his approval of payment or present the partial payment estimate to the Contractor indicating in writing his reasons for refusing to approve payment. In the latter case, the Contractor may make the necessary corrections and resubmit the partial payment estimate. The OWNER will, within ten (10) consecutive calendar days of presentation to him of an approved partial payment estimate, pay the Contractor a progress payment on the basis on the approved partial payment estimate.

The request for payment may also include an allowance for the cost of such major materials and equipment, which are suitably stored either at or near the site. All Work covered by partial payment made shall thereupon become the sole property of the OWNER, but this provision shall not be construed as relieving the Contractor of the sole responsibility for the care and protection of the Work upon which payments have been made or the restoration of any damaged Work, or as a waiver of the right of the OWNER to require the fulfillment of all terms of the Contract Documents.

Upon completion and acceptance of the Work, the Engineer shall issue a certificate attached to the final payment request that the Work has been accepted by him under the conditions of the Contract Documents. The entire balance found to be due the Contractor, including the retained percentages, but except such sums as may be lawfully retained by the OWNER, shall be paid to the Contractor within thirty (30) consecutive calendar days of completion and acceptance of the Work.

The Contractor will indemnify and save the OWNER and the OWNER'S agents harmless from all claims growing out of the lawful demands of subcontractors, laborers, workmen, mechanics, materialmen, and furnishers of machinery and parts thereof, equipment, tools, and all supplies, incurred in the furtherance of the performance of the Work. The Contractor shall, at the OWNER'S request, furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged, or waived. If the Contractor fails to do so the OWNER may, after having notified the Contractor, either pay unpaid bills or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the Contractor shall be resumed, in accordance with the terms of the Contract Documents, but in no event shall the provisions of this sentence be construed to impose any obligations upon the OWNER to either the Contractor, his Surety, or any third party. In paying any unpaid bills of the Contractor, any payment so made by the OWNER shall be considered as a payment made under the Contract Documents by the OWNER to the Contractor and the OWNER shall not be

therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways structures and utilities not designated for removal, relocation or replacement in the course of construction.

The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. He shall erect and maintain, as required by the conditions and progress of the Work, all necessary safeguards for safety and protection. He shall notify owners of adjacent utilities when prosecution of the Work may affect them. The Contractor shall remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the Contractor, any subcontractor of anyone directly and indirectly employed by any of them or anyone for whose acts any of them be liable, except damage or loss attributable to the fault of the Contract Documents or to the acts or omissions of the OWNER or the Engineer or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the Contractor.

In emergencies affecting the safety of persons or the Work or property at the site or adjacent thereto, the Contractor with special instruction or authorization from the Engineer or OWNER, shall act to prevent threatened damage, injury or loss. He shall give the Engineer prompt Written Notice of any significant changes in the Work or deviations from the Contract Documents caused thereby, and a Change Order shall thereupon be issued covering the changes and deviations involved.

#### 1.54 WORK ON "PRIVATE PROPERTY"

Private property is defined as property other than that belonging to the OWNER.

Highway and railroad rights-of-way, public parks, schoolyards and other such properties shall be considered "private properties" for the purpose of this Paragraph.

In connection with water line, sewer line, gas line or similar work performed on "private property", the Contractor shall confine his equipment, the storage of materials and the operations of his workmen to the limits indicated on the Drawings, or to lands and rights-of-way provided for the Project by the OWNER, and shall take every precaution to avoid damage to the buildings, grounds and facilities of the owners' of private property.

Fences, walls, hedges, shrubs, etc., shall be carefully removed, preserved, and replaced when the construction is completed. Grassed areas, other than lawns, shall be graded, fertilized and seeded when construction is completed and in accordance with the requirements of the technical Specifications. Where ditches or excavations cross lawns, the sod shall be removed carefully and replaced when the backfilling has been completed. If sod is damaged or not handled properly, it shall be replaced with new

lighted, in order to minimize confusion.

All excavated materials and equipment to be incorporated in the Work shall be placed so as not to injure any part of the Work or existing facilities and so that free access can be had at all times to all parts of the Work and to all public utility installations in the vicinity of the Work. Materials and equipment shall be kept neatly piled and compactly stored in such locations as will cause a minimum of inconvenience to public travel and adjoining owners, tenants and occupants.

#### 1.57 EXISTING UTILITIES

Special precautions shall be taken by the Contractor to avoid damage to existing overhead and underground utilities owned and operated by the OWNER or by public or private utility companies.

The location of existing underground utilities is *sometimes* shown on the Drawings. When utilities are shown, it is believed that the locations are reasonably correct but neither the Engineer nor the OWNER can guarantee the accuracy or adequacy of the information presented. Before proceeding with the Work, the Contractor shall confer with all public or private companies, agencies or departments that own and operate utilities in the vicinity of the Construction Work. The purpose of the conference, or conferences, shall be to notify said companies, agencies or departments of the proposed construction schedule, verify the location of, and possible interference with, the existing utilities that are shown on the Drawings, arrange for necessary suspension of service, and make arrangements to locate and avoid interference with all utilities (including house connections) that are not shown on the Drawings. The Engineer and OWNER have no objection to the Contractor arranging for the said utility companies, agencies, or departments to locate and uncover their own utilities; however, the Contractor shall bear the entire responsibility and cost for locating and avoiding, or repairing, damage to said existing utilities.

The Contractor shall locate all unknown metallic hazards, namely buried pipe, metals, etc., by using a pipe locator. The pipe locator shall immediately precede the trench ditching and all hazards located shall be marked in such a manner as to notify the machine operator of such hazard.

Where existing utilities or appurtenant structures, either underground or aboveground, are encountered, they shall not be displaced or molested unless necessary, and in such case shall be replaced in as good or better condition than found as quickly as possible. Relocation and/or replacement of all utilities and appurtenant structures to accommodate the construction work shall be at the Contractor's expense, unless such relocation and/or replacement is by statute or agreement the responsibility of the owner of the utility.

#### 1.58 ARBITRATION

- C. **Arbitration Procedure:** The arbitrators shall deliver a written notice to each of the parties and to the Engineer, either personally or by registered mail to the last known address of each, of the time and place for the beginning of the hearing of the matters submitted to them. Each party may submit to the arbitrators such evidence and argument as he may desire and the arbitrators may consider pertinent. The arbitrators shall, however, be the judge of all matters of law and fact relating to both the subject matter of and the procedure during arbitration and shall not be bound by technical rules of law or procedure. They may hear evidence in whatever form they desire. The parties may be represented before them by such person or persons as each may select, subject to the disciplinary power of the arbitrators if such representative shall not interfere with the orderly or speedy conduct of the proceedings.

Each party and the Engineer shall supply the arbitrators with such papers and information as they may request, or with any witness whose movements are subject to the respective control, and upon refusal to comply with such requests, the arbitrators may render their decision without the evidence which might have been elicited therefrom and the absence of such evidence shall afford no ground for challenge of the award by the party refusing or neglecting to comply with such demand.

The submission to arbitrators (the statement of the matters in dispute between the parties to be passed upon by the arbitrators) shall be in writing duly acknowledged before a notary. Unless waived in writing by both parties to the arbitration, the arbitrators, before hearing testimony, shall be sworn by an officer authorized by law to administer an oath, to faithfully and fairly hear and examine the matters in controversy and to make a just award according to the best of their understanding.

The arbitrators, if they deem the case demands it, are authorized to award to the party whose contention is sustained such sums as they shall consider proper for the time, expense and trouble incident to the arbitration, and if the arbitration was requested without reasonable cause, damages for delay and other losses. The arbitrators shall fix their own compensation, unless otherwise provided by agreement, and shall assess the costs and charges of the arbitration upon either or both parties.

The award of the arbitrators shall be in writing and acknowledged like a deed to be recorded, and a duplicate shall be delivered personally or by registered mail, forthwith upon its rendition, to each of the parties to the controversy and to the Engineer. Judgment may be rendered upon the award by the Federal Court or the highest State Court having jurisdiction to render same.

The award of the arbitrators shall not be open to objection on account of the form of proceedings or the award, unless otherwise provided by controlling statutes. In the event such statutes provide otherwise on any matter covered by this Article than hereinbefore specified, the method procedure throughout and the legal effect of the award shall be wholly in accord with said statutes, it being the intention hereby to lay down a principle of action to be followed, leaving its local application to be adapted to

or Specifications as he may find necessary. Any adjustment in the Contract price or time as may be justifiable shall be made by means of a written change order as provided herein.

#### 1.61 CLAIMS FOR EXTRA WORK

If the Contractor claims that any instructions by Drawings or otherwise involve extra cost, he shall give the Engineer written notice of said claim within ten (10) consecutive calendar days after the receipt of such instructions, and in any event before proceeding to execute the Work, stating clearly and in detail the basis of his claim or claims. No such claim shall be valid unless so made.

Claims for additional compensation for extra work, due to alleged errors in spot elevations, contour lines, or bench marks, will not be recognized unless accompanied by certified survey data, made prior to the time the original ground was disturbed, clearly showing that errors exist which resulted, or would result, in handling more material, or performing more work than would reasonably be estimated from the Drawings and topographical maps issued.

Any discrepancies which may be discovered between actual conditions and those represented by the topographical maps and Drawings shall at once be reported to the Engineer, and Work shall not proceed, except at the Contractor's risk, until written instructions have been received by him from the Engineer.

If, on the basis of the available evidence, the Engineer determines that an adjustment of the Contract price or time is justifiable, the procedure shall then be as provided herein for "Changes in the Work".

By execution of this Contract, the Contractor warrants that he has visited the site of the proposed work and fully acquainted himself with the conditions there existing relating to construction and labor, and that he fully understands the facilities, difficulties, and restrictions attending the execution of the work under this Contract. The Contractor further warrants that he has thoroughly examined and is familiar with the Drawings, Specifications and all other documents comprising the Contract. The Contractor further warrants that by execution of this Contract his failure when he was bidding on this Contract to receive or examine any form, instrument or document, or to visit the site and acquaint himself with conditions there existing, in no way relieves him from any obligation under the Contract, and the Contractor agrees that the OWNER shall be justified in rejecting any claim based on facts regarding which he should have been on notice as a result thereof.

#### 1.62 DETERMINATION OF THE VALUE OF EXTRA (ADDITIONAL) OR OMITTED WORK

The value of extra (additional) or omitted work shall be determined in one or more of

If the Contractor should neglect or fail to prosecute the Work properly or fail or refuse to perform any provision of the Contract, the OWNER, after ten (10) consecutive calendar days written notice to the Contractor, may without prejudice to any other remedy he may have, make good such deficiencies and may deduct the cost thereof from any monies due or which may thereafter become due to the Contractor.

#### 1.65 SUSPENSION OF WORK

The OWNER shall have authority to suspend the Work in whole or in part by giving five (5) consecutive calendar days notice to the Contractor in writing. The written notice shall fix the date on which the Work shall be resumed, and the Contractor shall resume the Work on the date so fixed. The OWNER shall reimburse the Contractor for expenses incurred by him in connection with the Work under this Contract as a result of suspension if the suspension of the Work is caused through no fault of the Contractor himself.

#### 1.66 RIGHT OF OWNER TO TERMINATE CONTRACT

If the Contractor fails to begin the Work under the Contract within the specified time, or fails to perform the Work with sufficient workmen and equipment or with sufficient materials to insure the prompt completion of said Work within the specified time, or shall, in the opinion of the Engineer, perform the Work improperly, or shall neglect or refuse to remove materials or perform anew such Work as shall be rejected as defective or unsuitable or shall be stopped by court order resulting from injunctive action, or shall become insolvent or be declared bankrupt or commit any act of bankruptcy or insolvency, or allow any final judgment to stand against him unsatisfied for a period of five (5) consecutive calendar days, or shall fail or refuse to remove within forty-eight (48) hours after receipt of proper notice, any employee or person engaged in work under the Contract, or shall make an assignment for the benefit of creditors or from any other cause whatsoever shall not carry out the Work in an acceptable manner, the OWNER shall give notice in writing to the Contractor and his surety, of such delay, neglect, or default, specifying the same, and if the Contractor within a period of ten (10) consecutive calendar days after such notice shall not proceed in accordance therewith, then the OWNER shall, upon written certificate from the Engineer of the face of such delay, neglect or default, and the Contractor's failure to comply with such notice, have full power and authority without violating the Contract to terminate the Contractor's right to proceed with the Work, to take over the prosecution of the work of said Contractor, to appropriate or use any and all materials and equipment on the ground as may be suitable and acceptable, and may enter into an agreement for the completion of said Contract according to the terms and provisions thereof, and use such other methods as in the OWNER'S opinion shall be required for the completion of said Contract in an acceptable manner. All costs and charges incurred by the OWNER, together with the costs of completing the work under Contract, shall be deducted from any monies due or which may become due said Contractor. In case the expense so incurred by the OWNER shall be less than the sum which would have been payable

Engineer will make such a review and subsequent reviews as required. When, in the Engineer's opinion, the Work is acceptable under the Contract, he will promptly issue a Certificate of Acceptance.

Upon acceptance of the Work by the OWNER, the balance due the Contractor including the percentage retained during the construction period, will then be paid in approximately sixty (60) consecutive calendar days, and said final payment shall evidence the OWNER'S acceptance of the Work unless the OWNER has made acceptance or partial acceptance thereof in writing prior to said final payment.

Before the OWNER makes final payment, the Contractor shall submit to the OWNER a final release, as described hereinafter, stating that all payrolls, material bills, subcontractors, and other indebtedness connected with the Work have been paid and providing for handling claims that may be outstanding or that may arise after the settlement.

Any payment, however, final or otherwise, shall not release the Contractor or his sureties from any obligations under the Contract Documents or the Performance Bond and Payment Bond.

#### 1.70 CONTRACTOR'S FINAL RELEASE

Before the OWNER pays the Contractor his final payment on the Work, the Contractor will be required to sign a final release as set out hereinbefore. This final release shall be notarized and shall state that all claims against the OWNER on the Contractor's part have been met in full; it shall further state that all accounts for labor performed, materials furnished, liens, judgments and claims of every nature against the Contractor have been satisfied by him. It shall further state that any obligation or lawsuit whatsoever arising from the Contractor's operations on the Project, which may be presented or filed after the settlement, shall be borne by the Contractor. In case the Contractor is unable to settle any claim that may be in dispute or litigation, the OWNER may allow him to furnish a proper bond to indemnify the OWNER against the claim and then release the final payment to him.

It is understood that the Contractor is to guarantee to the OWNER all construction against defective materials, equipment and workmanship for a period of twelve (12) months after acceptance, and shall take immediate steps to correct or replace such defective materials, equipment or workmanship without cost to the OWNER.

#### 1.71 FINAL CLEAN UP

The Work will not be considered as completed, and final payment will not be made, until all final clean up has been done by the Contractor in a manner satisfactory to the Engineer.

## **Division 1 – General Requirements**

1.04 EXISTING CONDITIONS AND DIMENSIONS

- A. The Work in this Contract will primarily be performed in or around existing facilities of which must remain functional. This Contractor must maintain the required items and/or systems functional without additional effort by the Owner's personnel and at no extra costs to the Owner.
- B. The Contractor is responsible for verifying all existing conditions, elevations, dimensions, etc., and providing his finished work to facilitate existing conditions.

END OF SECTION 01010

Contractor shall submit a written request to the Engineer and Owner ten (10) days prior to any specific construction activity that disrupts existing operations. The Owner must pre-approve any construction activity that will cause a temporary shutdown of any existing water or sewer lines.

END OF SECTION 01015

## SECTION 01040 - COORDINATION

### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

- A. The Contractor shall coordinate the Work of all crafts, trades and subcontractors engaged on the Work, and he shall have final responsibility in regards to the schedule, workmanship and completeness of each and all parts of the Work.
- B. It shall be the Contractor's responsibility to ensure cooperation and coordination of all crafts, trades, subcontractors and others as they may be involved in the installation of work which adjoins, incorporates, precedes or follows the work of another. It shall be the Contractor's responsibility to point out areas of cooperation prior to execution of subcontract agreements and the assignment of the parts of the Work. Each craft, trade and subcontractor shall be made responsible to the Owner, for furnishing embedded items, giving directions for doing all cutting and fitting, making all provisions for accommodating the Work, and for protecting, patching, repairing and cleaning as required to satisfactorily perform the Work.
- C. The Contractor shall be responsible for all cutting, digging and other action of his subcontractors and workmen. Where such action impairs the safety or function of any structure or component of the Project, the Contractor shall make such repairs, alterations and additions as will, in the opinion of the Engineer, bring said structure or component back to its original design condition at no additional cost to the Owner.
- D. Each subcontractor is expected to be familiar with the General Requirements and all Sections of the Detailed Specifications for all other trades and to study all Drawings applicable to his work to the end that complete coordination between the trades will be affected. Each Contractor shall consult with the Engineer if conflicts exist on the Drawings.
- E. No extra compensation will be allowed to cover the cost of removing piping, conduits, etc., or equipment found encroaching on space required by others.

END OF SECTION 01040

## SECTION 01070 - ABBREVIATIONS AND SYMBOLS

### PART 1 - GENERAL

#### 1.01 REQUIREMENTS INCLUDED

Where any of the following abbreviations are used in the Contract Documents, they shall have the meaning set forth as follows.

#### 1.02 QUALITY ASSURANCE

- A. For products or workmanship specified by association, trade or federal standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. The date of the standard is that in effect as of the Bid date, or date of Owner-Contractor Agreement when there are no bids, except when a specific date is specified.
- C. When required by individual Specifications section, obtain copy of standard. Maintain a copy at job site during submittals, planning and progress of the specific work, until Substantial Completion.

#### 1.03 SCHEDULE OF REFERENCES

ACI	American Concrete Institute
AFBMA	Anti-Friction Bearing Manufacturers Association
AGMA	American Gear Manufacturers Association
IEEE	Institute of Electrical and Electronics Engineers, Inc.
AISC	American Institute of Steel Construction
ANS	American National Standard
ANSI	American National Standards Institute
API	American Petroleum Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers

## SECTION 01300 - SUBMITTALS

### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

Shop drawing, descriptive literature, project data and samples (when samples are specifically requested) for all manufactured or fabricated items shall be submitted by the Contractor to the Engineer for examination and review in the form and in the manner required by the Engineer. All submittals shall be furnished in at least three (3) copies to be retained by the Engineer and shall be checked and reviewed by the Contractor before submission to the Engineer. The review of the submittal by the Engineer shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is satisfactory. Review of such submittal will not relieve the Contractor of the responsibility for any errors, which may exist, as the Contractor shall be responsible for the dimensions and design of adequate connections, details, and satisfactory construction of all work.

#### 1.02 RELATED REQUIREMENTS

- A. Section 00700 - General Conditions.
- B. Section 01720 - Project Record Documents (As-Built).

#### 1.03 DEFINITIONS

The term "submittals" shall mean shop drawings, manufacturer's drawings, catalog sheets, brochures, descriptive literature, diagrams, schedules, calculations, material lists, performance charts, test reports, office and field samples, and items of similar nature which are normally submitted for the Engineer's review for conformance with the design concept and compliance with the Contract Documents.

#### 1.04 GENERAL CONDITIONS

Review by the Engineer of shop drawings or submittals of material and equipment shall not relieve the Contractor from the responsibilities of furnishing same of proper dimension, size, quantity, materials and all performance characteristics to efficiently perform the requirements and intent of the Contract Documents. Review shall not relieve the Contractor from responsibility for errors of any kind on the shop drawings. Review is intended only to assure conformance with the design concept of the Project and compliance with the information given in the Contract Documents. Review of shop drawings shall not be construed as releasing the Contractor from the responsibility of complying with the Specifications.

- G. The Contractor shall review and check submittals, and indicate his review and approval by initials and date.
- H. If the submittals deviate from the Contract Drawings and/or Specifications, the Contractor shall advise the Engineer, in letter of transmittal of the deviation and the reasons therefore. All changes shall be clearly marked on the submittal with a bold mark other than red. Any additional costs for modifications shall be borne by the Contractor.
- I. In the event the Engineer does not specifically reject the use of material or equipment at variance to that which is shown on the Drawings or specified, the Contractor shall, at no additional expense to the Owner, and using methods reviewed by the Engineer, make any changes to structures, piping, controls, electrical work, mechanical work, etc., that may be necessary to accommodate this equipment or material. Should equipment other than that on which design drawings are based be accepted by the Engineer, shop drawings shall be submitted detailing all modification work and equipment changes made necessary by the substituted item.
- J. Additional information on particular items, such as special drawings, schedules, calculations, performance curves, and material details, shall be provided when specifically requested in the technical Specifications.
- K. Submittals for all electrically operated items (including instrumentation and controls) shall include complete wiring diagrams showing lead, runs, number of wires, wire size, color coding, all terminations and connections, and coordination with related equipment.
- L. Equipment shop drawings shall indicate all factory or shop paint coatings applied by suppliers, manufacturers and fabricators; the Contractor shall be responsible for insuring the compatibility of such coatings with the field-applied paint products and systems.
- M. Fastener specifications of manufacturer shall be indicated on equipment shop drawings.
- N. Where manufacturer's brand names are given in the Specifications for building and construction materials and products, such as grout, bonding compounds, curing compounds, masonry cleaners, waterproofing solutions and similar products, the Contractor shall submit names and descriptive literature of such materials and products he proposes to use in this Contract.
- O. No material shall be fabricated or shipped unless the applicable drawings or submittals have been reviewed by the Engineer and returned to the Contractor.
- P. All bulletins, brochures, instructions, parts lists, and warranties packaged with and accompanying materials and products delivered to and installed in the Project shall be

## SECTION 01380 - CONSTRUCTION PHOTOGRAPHS

### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

Provide monthly photographs of the construction throughout the progress of the Work. Prior to initiating any work on the project site, the Contractor shall provide two sets of twenty-four (24) photographs, or more as may be necessary, that illustrate pre-construction conditions.

#### 1.02 RELATED WORK

- A. Section 00700 - General Conditions.
- B. Section 01700 - Project Closeout.

#### 1.03 PHOTOGRAPHY

- A. Provide monthly photographs (two sets) of the construction throughout progress of the Work. Provide twenty-four (24) views of Work each month or more as may be necessary to clearly show any new work.
- B. Take the photographs as close as possible to the cutoff date for each Application for Payment.
- C. Take photographs at the beginning, during, and completion of each element of construction.

#### 1.04 FORMAT

- A. CD of digital photographs.
- B. Label CD with project title and range of dates that photographs were taken.

#### 1.05 TECHNIQUE

- A. All views shall provide factual presentation of the Work progress.
- B. All photos shall provide correct exposure and focus, high resolution and sharpness, maximum depth of field and minimum distortion.

#### 1.06 VIEWS

## SECTION 01400 - QUALITY CONTROL

### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

- A. Work of all crafts and trades shall be laid out to lines and elevations as established by the Contractor from the Drawings or from instructions by the Engineer.
- B. Unless otherwise shown, all work shall be plumb and level, in straight lines and true planes, parallel or square to the established lines and levels. The Work shall be accurately measured and fitted to tolerance as established by the best practices of the crafts and trades involved, and shall be as required to fit all parts of the Work carefully and neatly together.
- C. All equipment, materials and articles incorporated into the Work shall be new and of comparable quality as specified. All workmanship shall be first-class and shall be performed by mechanics skilled and regularly employed in their respective trades.
- D. The Contractor shall determine that the equipment he proposes to furnish can be brought into the facility and installed in the space available. Equipment shall be installed so that all parts are readily accessible for inspection and maintenance.

#### 1.02 WORKMANSHIP

Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.

#### 1.03 MANUFACTURERS' INSTRUCTION

Comply with manufacturer's instructions in full detail as to shipping, handling, storing, installing, start-up and operation.

#### 1.04 TESTING SERVICES

- A. Tests, inspections and certifications of materials, equipment, subcontractors or completed work, as required by the various sections of the Specifications and as shown on the Drawings, except as otherwise noted, shall be provided by the Contractor and all costs shall be included in the Contract Price.
- B. The Contractor shall submit to the Owner for approval the name of the independent testing laboratory to be employed by the Contractor.
- C. Contractor shall deliver written notice to the Engineer at least two (2) work days in

## SECTION 01535 - PROTECTION OF INSTALLED WORK

### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

Protection for products, including Owner-provided products, after installation.

#### 1.02 RELATED REQUIREMENTS

Division 1 - General Requirements.

### PART 2 - PRODUCTS (NOT USED)

### PART 3 - EXECUTION

#### 3.01 PROTECTION AFTER INSTALLATION

- A. Protect installed products and control traffic in immediate area to prevent damage from subsequent operations.
- B. Restrict traffic of any kind across planted lawn and landscape areas.

END OF SECTION 01535

## SECTION 01565 - EROSION AND SEDIMENT CONTROL

### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

- A. The Contractor shall do all Work and take all measures necessary to control soil erosion resulting from construction operations, shall prevent the flow of sediment from the construction site, and shall contain construction materials (including excavation and backfill) within his protected working area so as to prevent damage to the adjacent wetlands and water courses.
- B. The Contractor shall not employ any construction method that violates a rule, regulation, guideline or procedure established by Federal, State or local agencies having jurisdiction over the environmental effects of construction.
- C. Pollutants such as chemicals, fuels, lubricants, bitumen, raw sewage and other harmful waste shall not be discharged into or alongside of any body of water or into natural or man-made channels leading thereto.

### PART 2 - PRODUCTS

#### 2.01 MATERIALS

Bales may be hay or straw, and shall be reasonably clean and free of noxious weeds and deleterious materials. Filter fabric for sediment traps shall be of suitable materials acceptable to the Engineer.

### PART 3 - EXECUTION

#### 3.01 METHODS OF CONSTRUCTION

- A. The Contractor shall use any of the acceptable methods necessary to control soil erosion and prevent the flow of sediment to the maximum extent possible. These methods shall include, but not be limited to, the use of water diversion structures, diversion ditches and settling basins.
- B. Construction operations shall be restricted to the areas of work indicated on the Drawings and to the area which must be entered for the construction of temporary or permanent facilities. The Engineer has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and fill operations and to direct the Contractor to provide immediate permanent or temporary pollution control measures to prevent contamination of the wetlands and adjacent watercourses. Such work may involve the construction of temporary berms, dikes,

### 3.02 EROSION CHECKS

The Contractor shall furnish and install baled hay or straw erosion checks surrounding the base of all deposits of stored excavated material outside of the disturbed area, and where indicated by the Engineer. Checks located surrounding stored material shall be located approximately 6 feet from that material. Bales shall be held in place with two 2 inch by 2 inch by 3 feet wooden stakes. Each bale shall be butted tightly against the adjoining bale to preclude short circuiting of the erosion check.

END OF SECTION 01565

- C. Traffic control shall be provided according to the Kentucky Department of Highways Manual on Uniform Traffic Control Devices for Streets and Highways.

3.03 FLAGMEN

Provide trained and equipped flagmen to regulate traffic when construction operations or traffic encroach on public traffic lanes.

3.04 FLARES AND LIGHTS

Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

3.05 HAUL ROUTES

- A. Consult with authorities, establish public thoroughfares to be used for haul routes and site access.
- B. Confine construction traffic to designated haul routes.
- C. Provide traffic control at critical areas of haul routes to regulate traffic and minimize interference with public traffic.

3.06 REMOVAL

Remove equipment and devices when no longer required.

END OF SECTION 01570

and to determine whether it conforms to the Contract requirements. Such data shall be submitted in a manner similar to that specified for submission of shop and working drawings.

- C. Facilities and labor for the storage, handling, and inspection of all materials and equipment shall be furnished by the Contractor. Defective materials and equipment shall be removed immediately from the site of the Work.
- D. If the Engineer so requires, either prior to or after commencement of the Work, the Contractor shall submit samples of materials for such special tests as the Engineer deems necessary to demonstrate that they conform to the Specifications. Such samples, including concrete test cylinders, shall be furnished, taken, stored, packed, and shipped by the Contractor as directed. The Contractor shall furnish suitable molds for and make the concrete test cylinders. Except as otherwise expressly specified, the Contractor shall make arrangements for, and pay for, the tests.
- E. All samples shall be packed so as to reach their destination in good condition, and shall be labeled to indicate the material represented, the name of the building or work and location for which the material is intended, and the name of the Contractor submitting the sample. To ensure consideration of samples, the Contractor shall notify the Engineer by letter that the samples have been shipped and shall properly describe the samples in the letter. The letter of notification shall be sent separate from and should not be enclosed with the samples.
- F. The Contractor shall submit data and samples, or place his orders, sufficiently early to permit consideration, inspection and testing before the materials and equipment are needed for incorporation in the Work. The consequences of his failure to do so shall be the Contractor's sole responsibility.
- G. In order to demonstrate the proficiency of workmen, or to facilitate the choice among several textures, types, finishes, surfaces, etc., the Contractor shall provide such samples of workmanship of wall, floor, finish, etc., as may be required.
- H. When required, the Contractor shall furnish to the Engineer triplicate sworn copies of manufacturer's shop or mill tests (or reports from independent testing laboratories) relative to materials, equipment performance ratings, and concrete data.
- I. After review of the samples, data, etc., the materials and equipment used on the Work shall in all respects conform therewith.

END OF SECTION 01600

### 3.03 EXTERIOR STORAGE

- A. Provide substantial platforms, blocking, or skids, to support fabricated products above ground; slope to provide drainage. Protect products from soiling and staining.
- B. For products subject to discoloration or deterioration from exposure to the elements, cover with impervious sheet material. Provide ventilation to avoid condensation.
- C. Store loose granular materials on clean, solid surfaces such pavement, or on rigid sheet materials, to prevent mixing with foreign matter.
- D. Provide surface drainage to prevent erosion and ponding of water.
- E. Prevent mixing of refuse or chemically injurious materials.

### 3.04 MAINTENANCE OF STORAGE

- A. Periodically, inspect stored products on a scheduled basis. Maintain a log of inspections, make available to Engineer on request.
- B. Verify that storage facilities comply with manufacturer's product storage requirements.
- C. Verify that manufacturer required environmental conditions are maintained continually.
- D. Verify that surfaces of products exposed to the elements are not adversely affected. Weathering of finishes is unacceptable under the requirements of the Contract Documents.

### 3.05 MAINTENANCE OF EQUIPMENT STORAGE

- A. For mechanical and electrical equipment in long-term storage, provide manufacturer's service instructions to accompany each item, with notice of enclosed instructions shown on exterior of package.
- B. Service equipment on a regularly scheduled basis, in accordance with the manufacturer's recommendations, maintaining a log of services; submit as a record document.

END OF SECTION 01620

3. Contractor: Complete work listed for completion or correction, within designated time.
- D. Should Engineer consider that work is not substantially complete:
1. He shall immediately notify Contractor, in writing, stating reasons.
  2. Contractor: Complete work, and send second written notice to Engineer, certifying that Project, or designated portion of project is substantially complete.
  3. Engineer will re-review work.

#### 1.03 FINAL INSPECTION

- A. Contractor shall submit written certification that:
1. Contract Documents have been reviewed.
  2. Project has been inspected for compliance with Contract Documents.
  3. Work has been completed in accordance with Contract Documents.
  4. Equipment and systems have been tested in presence of Owner's representative and are operational.
  5. Project is completed and ready for final inspection.
- B. Engineer will make final on-site observation/review within seven (7) days after receipt of certification.
- C. Should Engineer consider that work is finally complete in accordance with requirements of Contract Documents, he shall request Contractor to make Project Closeout submittals.
- D. Should Engineer consider that work is not finally complete:
1. He shall notify Contractor, in writing, stating reasons.
  2. Contractor shall take immediate steps to remedy the stated deficiencies, and send second written notice to Engineer certifying that work is complete.
  3. Engineer will re-review the work.

#### 1.04 FINAL CLEANING UP

The work will not be considered as completed and final payment made until all final cleaning up has been done by the Contractor in a manner satisfactory to the Engineer. See Section 01710 for detailed requirements.

#### 1.05 CLOSEOUT SUBMITTALS

- A. Project Record Documents: to requirements of Section 01720.
- B. Operation and Maintenance Data: to requirements of particular technical specifications and Section 01730.

## SECTION 01710 - CLEANING

### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

- A. On a continuous basis, maintain premises free from accumulations of waste, debris, and rubbish, caused by operations.
- B. At completion of Work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all sight-exposed surfaces; leave Project clean and ready for occupancy.

#### 1.02 RELATED REQUIREMENTS

- A. Section 01045 - Cutting and Patching.
- B. Section 01700 - Project Closeout.
- C. Cleaning for Specific Products or Work: Specification Section for that work.

#### 1.03 SAFETY REQUIREMENTS

- A. Hazards control:
  - 1. Store volatile wastes in covered containers, and remove from premises daily.
  - 2. Prevent accumulation of wastes which create hazardous conditions.
  - 3. Provide adequate ventilation during use of volatile or noxious substances.
- B. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
  - 1. Do not burn or bury rubbish and waste materials on Project site without written permission from the Owner.
  - 2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
  - 3. Do not dispose of wastes into streams or waterways.

### PART 2 - PRODUCTS

#### 2.01 MATERIALS

- A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
- B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

## SECTION 01720 - PROJECT RECORD DOCUMENTS

### PART 1 - GENERAL

#### 1.01 RELATED REQUIREMENTS

- A. Section 00700 - General Conditions.
- B. Section 01300 - Submittals.

#### 1.02 MAINTENANCE OF DOCUMENTS

- A. Maintain at job site, one copy of:
  - 1. Contract Drawings.
  - 2. Specifications.
  - 3. Addenda.
  - 4. Reviewed Shop Drawings.
  - 5. Change Orders.
  - 6. Other Modifications to Contract.
- B. Store documents in approved location, apart from documents used for construction.
- C. Provide files and racks for storage of documents.
- D. Maintain documents in clean, dry legible condition.
- E. Do not use record documents for construction purposes.
- F. Make documents available at all times for inspection by Engineer and Owner.

#### 1.03 MARKING DEVICES

Provide colored pencil or felt-tip marking pen for all marking.

#### 1.04 RECORDING

- A. Label each document "RECORD DRAWING" in 2-inch high printed letters.
- B. Keep record documents current.
- C. Do not permanently conceal any work until required information has been recorded.

## SECTION 01730 - OPERATING AND MAINTENANCE DATA

### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

- A. Compile product data and related information appropriate for Owner's maintenance and operation of equipment furnished under the contract. Prepare operating and maintenance data as specified.
- B. Instruct Owner's personnel in the maintenance and operation of equipment and systems as outlined herein.
- C. In addition to maintenance and operations data, the manufacturer's printed recommended installation practice shall also be included. If not part of the operations and maintenance manual, separate written installation instructions shall be provided, serving to assist the Contractor in equipment installation.

#### 1.02 RELATED REQUIREMENTS

- A. Section 00700 - General Conditions.
- B. Section 01300 - Submittals.
- C. Section 01720 - Project Record Documents.
- D. Section 01740 - Warranties and Bonds.

#### 1.03 MAINTENANCE AND OPERATIONS MANUAL

Every piece of equipment furnished and installed shall be provided with two (2) complete maintenance and operations manuals. These shall be detailed in instructions to the Owner's personnel. They shall be attractively bound for the Owner's records.

The manuals shall be submitted to the Engineer for review as to adequacy and completeness. After approval the Contractor shall store all manuals until the completion of the project or until requested by the Engineer. The manuals will be stored and delivered to the Engineer in an organized format.

#### 1.04 FORM OF SUBMITTALS

- A. Prepare data in the form of an instructional manual for use by Owner's personnel.

- B. Product Data:
  - 1. Include only those sheets which are pertinent to the specific product. References to other sizes and types or models of similar equipment shall be deleted or lined out.
  - 2. Annotate each sheet to:
    - a. Clearly identify the specific product or part installed.
    - b. Clearly identify the data applicable to the installation.
    - c. Provide a parts list for all new equipment items, with catalog numbers and other data necessary for ordering replacement parts.
    - d. Delete references to inapplicable information.
  - 3. Clear and concise instructions for the operation, adjustment, lubrication, and other maintenance of the equipment including a lubrication chart.
- C. Drawings:
  - 1. Supplement product data with drawings as necessary to clearly illustrate:
    - a. Relations of component parts of equipment and systems.
    - b. Control and flow diagrams.
  - 2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
  - 3. Do not use Project Record Documents as maintenance drawings.
- D. Written text, as required to supplement product data for the particular installation:
  - 1. Organize in a consistent format under separate headings for different procedures.
  - 2. Provide a logical sequence of instructions for each procedure.
- E. Copy of each warranty, bond and service contract issued: Provide information sheet for Owner's personnel.
  - 1. Proper procedures in the event of failure.
  - 2. Instances which might affect the validity of warranties or bonds.
- F. These manuals shall be submitted to the Engineer for review at the same time that the equipment to which it pertains is delivered at the site. The manuals must be approved by the Engineer before final payment on the equipment is made.

END OF SECTION 01730

- a. Proper procedure in case of failure.
  - b. Instances which might affect the validity of warranty or bond.
7. Contractor name, address and telephone number.

1.05 FORM OF SUBMITTALS

- A. Prepare in duplicate packets.
- B. Format:
  1. Size 8 1/2-inch x 11 inches, punch sheets for 3-ring binder: Fold larger sheets to fit into binders.
  2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS". List:
    - a. Title of Project.
    - b. Name of Contractor.
- C. Binders: Commercial quality, three-ring, with durable and cleanable plastic covers.

1.06 TIME OF SUBMITTALS

- A. For equipment or component parts of equipment put into service during progress of construction: Submit documents within ten (10) days after inspection and acceptance.
- B. Otherwise, make submittals within ten (10) days after date of substantial completion, prior to final request for payment.
- C. For items of work, where acceptance is delayed materially beyond the Date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing the date of acceptance as the start of the warranty period.

1.07 SUBMITTALS REQUIRED

Submit warranties, bonds, service and maintenance contracts as specified in the respective sections of the Specifications. Additionally, the Contractor shall warrant the entire contract, including all concrete, paving, building, plumbing, HVAC, mechanical and electrical equipment to be free from defects in design and installation for one (1) year from the date of startup. In the event a component fails to perform as specified or is proven defective in service during the warranty period, the Contractor shall repair the defect without cost to the Owner.

END OF SECTION 01740

## SECTION 02223 – EMBANKMENTS AND BACKFILL

### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

- A. Structure perimeter backfilling to subgrade elevations.
- B. Site backfilling.
- C. Compaction requirements.
- D. Access road subgrade preparation.

#### 1.02 RELATED WORK

- A. Section 00700 - Submittals (General Conditions).
- B. Section 01400 - Quality Control: Compaction requirements of backfill.
- C. Section 02222 - Excavation.
- D. Section 02225 - Excavation, Backfilling and Compacting for Utilities.

#### 1.03 REFERENCES

- A. Commonwealth of Kentucky, Standard Specifications for Road and Bridge Construction.
- B. ANSI/ASTM D698 - Moisture-Density Relations of Soils and Soil-Aggregate Mixture Using 5.5 lb Rammer and 12 inch Drop.
- C. ANSI/ASTM D1556 - Density of Soil in Place by the Sand-Cone Method.
- D. ASTM 2922 - Density of Soil and Soil-Aggregate in Place by Nuclear Methods.
- E. ASTM 3017 - Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

#### 1.04 TESTS

- A. Tests and analysis of fill materials will be performed in accordance with ANSI/ASTM D698 and under provisions of Section 01400. Tests shall include but not be limited to gradation analysis and moisture/density relationships.

- C. All material, whether from the excavations or from borrow, shall be of such nature that after it has been placed and properly compacted, it will make a dense, suitable fill. It shall not contain vegetation, masses of roots, individual roots more than 18-inches long or more than 1/2-inch in diameter, stones over 6-inches in diameter, or porous matter.

## 2.02 COMPACTED FILL

- A. Soil used for compacted fill in non-structural areas should be inorganic clayey soils free of deleterious debris or rocks whose largest dimension is no larger than 3-inches. The soil should have a liquid limit (LL) of less than 50, a plasticity index (PI) of less than 30, and a maximum dry density according to the standard Proctor compaction test of at least 100 pcf. The fill should be compacted to at least 95 percent of the SPMDD. The top foot of structural fill shall be compacted to 100 percent of the SPMDD.
- B. The moisture content of the compacted fill material shall be within 2% of the optimum moisture content as determined by ASTM-D-698.

## 2.03 STRUCTURAL BACKFILL

- A. An underdrain system shall be provided for the soil bearing structures. The underdrain should be constructed of 12-inches of #57 crushed stone and designed in a manner that would promote positive drainage away from the foundation elements. Final site grading should be accomplished in such a manner as to divert surface runoff and roof drains away from all foundation elements.
- B. All structures, unless otherwise noted on the Drawings, shall be supported entirely by bedrock or well compacted crushed stone consisting of Kentucky No. 610 size aggregate, DGA, or Controlled Low Strength Material. Structures that have pressure relief valves shall have a 12-inch blanket of #57 stone to allow for proper drainage around the PRV's. Any building supported by stone should have a minimum of 12-inches of compacted crushed stone beneath the bottom of the slab (i.e. foundation elements). Structures should not be supported on a combination of crushed stone and bedrock.
- C. Crushed stone used as a bearing medium should be placed in uniform, loose lifts not exceeding 8-inches in thickness. It is recommended that each lift be compacted by a minimum of five (5) passes of a smooth drum vibratory roller having a total static weight of not less than 20,000 pounds. The diameter of the drum should be between 5.0 and 5.5 feet and 6.0 and 6.5 feet wide.
- D. Walls below final grade should be backfilled with a minimum 12-inch thick layer of free draining material up to two feet below final grade. The two feet above this free draining material should be backfilled with an impervious material that would retard surface water infiltration. The free draining material should extend down to a rock blanket beneath the bottom slab. Areas within five (5) feet horizontally from vertical

- G. Backfill shall not be placed against or on structures until they have attained sufficient strength to support all loads to which subjected without distortion, cracking, or damage. Deposit soil evenly around the structure.
- H. Slope grade away from structures minimum 2-inches in 10-feet, unless noted otherwise.
- I. Make changes in grade gradual. Blend slopes into level areas.
- J. Remove surplus excavation materials to designated areas.

3.04 TOLERANCES

Top Surface of Backfilling: Plus or minus 1-inch.

3.05 FIELD QUALITY CONTROL

- A. Compaction testing will be performed in accordance with ASTM D1556 or ASTM D2922 and under provisions of Sections 01400.
- B. If tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to Owner.

END OF SECTION 02223

2. Where pipe is to be laid directly on the trench bottom, the lower part of trenches in earth shall not be excavated to subgrade by machinery. However, just before the pipe is to be placed, the last of the material to be excavated shall be removed by means of hand tools to form a flat or shaped bottom, true to grade, so that the pipe will have a uniform and continuous bearing and support on firm and undisturbed material between joints except for limited areas where the use of pipe slings may have disturbed the bottom.
- B. Trenches shall be sufficient width to provide working space on each side of the pipe and to permit proper backfilling around the pipe.
    1. The Contractor shall remove only as much of any existing pavement as is necessary for the prosecution of the Work. The pavement shall be cut with pneumatic tools, without extra compensation to the Contractor, to prevent damage to the remaining road surface. Where pavement is removed in large pieces, it shall be disposed of before proceeding with the excavation.
  - C. All excavated materials shall be placed a safe distance back from the edge of the trench.
  - D. Unless specifically directed otherwise by the Engineer, not more than 500 feet of trench shall be opened ahead of the pipe laying work of any one crew, and not more than 500 feet of open ditch shall be left behind the pipe laying work of any one crew. Watchmen or barricades, lanterns and other such signs and signals as may be necessary to warn the public of the dangers in connection with open trenches, excavations and other obstructions, shall be provided by and at the expense of the Contractor.
  - E. When so required, or when directed by the Engineer, only one-half of street crossings and road crossings shall be excavated before placing temporary bridges over the side excavated, for the convenience of the traveling public. All backfilled ditches shall be maintained in such manner that they will offer no hazard to the passage of traffic. The convenience of the traveling public and the property owners abutting the improvements shall be taken into consideration. All public or private drives shall be promptly backfilled or bridged at the direction of the Engineer.
  - F. Trench excavation shall include the removal of earth, rock, or other materials encountered in the excavating to the depth and extent shown or indicated on the Drawings.

### 3.02 WATER PIPE BEDDING

- A. Piping for water mains shall be supported as follows:
  1. The trench bottom for water main piping shall be stable, continuous, relatively smooth and free of frozen material, clodded dirt, foreign material and rock or granular material larger than 1/2 inch in diameter and shall be prepared with a minimum of 6 inches of crushed stone per the Drawings. The foundation for water main piping shall be prepared so that the entire load of the backfill on top

- b. Case II - Paved areas including streets, drives, parking areas, and walks.
  2. In all cases, walking or working on the completed pipelines, except as may be necessary in backfilling, will not be permitted until the trench has been backfilled to a point 12-inches above the top of the pipe. The method of final backfilling for each of the above cases is as follows:
    - a. Case I - The trench shall be backfilled from a point 12-inches above the top of the pipe to a point 8-inches below the surface of the ground with earth material free from large rock (over one-half cubic foot in volume), acceptable to the Engineer. The remainder of the trench shall be backfilled with earth material reasonably free of any rocks.
    - b. Case II - The trench shall be backfilled from a point 12-inches above the top of the pipe to a point 12-inches below the existing pavement surface with Class I (No. 9 crushed stone aggregate) material. The backfill shall be mechanically tamped in approximately 6-inch layers to obtain the maximum possible compaction. The remaining backfill shall be Class II (dense graded aggregate) material mechanically tamped to maximum possible compaction. The trench may be left with a slight mound if permitted by the Engineer. Where required by state or local regulations, a bituminous binder coarse detailed on the Drawings and specified in Section 02510 shall be incorporated in the final backfill.
  3. Earth and Class I material used in final backfill is not a separate pay item. Payment shall be included in the price of water main.
  4. Class II material used in final backfill shall be included in the unit price of the pipe.
- C. A sufficient amount of Class II material shall be stockpiled to ensure immediate replacement by the Contractor of any settled areas. No extra payment will be made for the filling in of settled or washed areas by the Contractor.
- D. Excavated materials from trenches, in excess of quantity required for trench backfill, shall be disposed of by the Contractor. It shall be the responsibility of the Contractor to obtain location or permits for its disposal, unless specific waste areas have been designated on the Drawings or noted in these Specifications. The cost of disposal of excess excavated materials, as set forth herein, no additional compensation being allowed for hauling or overhaul.

### 3.04 GRAVITY SEWER AND FORCE MAIN PIPE BEDDING

- A. Piping for gravity sewers and force mains shall be supported as follows:
  1. All gravity sewer piping shall be laid on a bed of granular material except when a concrete encasement situation occurs. All pipe bedding material shall be Class I (No. 9 crushed stone aggregate) and shall be placed to a depth of 6-inches in an earth trench and 6-inches in a rock trench. Aggregate bedding shall be graded to provide for a uniform and continuous support beneath the pipe at all points.
  2. The trench bottom for force main piping shall be stable, continuous, relatively

2. Material used, whether earth or Class I, in the initial backfilling is **not** a separate pay item. Payment for the material is included in the unit price per linear foot of gravity sewer or force main.
3. In areas where large quantities of rock are excavated and the available excavated earth in the immediate vicinity is insufficient for placing the required amount of backfill over the top of the pipe as set forth in Paragraph A.1, the Contractor shall either haul in earth or order Class I material for backfilling over the pipe. Neither the hauling and placement of earth nor the ordering and placement of Class I material to fulfill the backfill requirements set forth herein is considered a separate pay item.

B. Final Backfill:

1. There are two cases where the method of final backfilling varies. The various cases and their trench situations are as follows:
  - a. Case I - Areas not subject to vehicular traffic.
  - b. Case II - Paved areas including streets, drives, parking areas, and walks.
2. In all cases, walking or working on the completed pipelines, except as may be necessary in backfilling, will not be permitted until the trench has been backfilled to a point 12-inches above the top of the pipe. The method of final backfilling for each of the above cases is as follows:
  - a. Case I - The trench shall be backfilled from a point 12-inches above the top of the pipe to a point 8-inches below the surface of the ground with earth material free from large rock (over one-half cubic foot in volume), acceptable to the Engineer. The remainder of the trench shall be backfilled with earth material reasonably free of any rocks.
  - b. Case II - The trench shall be backfilled from a point 12-inches above the top of the pipe to a point 12-inches below the existing pavement surface with Class I (No. 9 crushed stone aggregate) material. The backfill shall be mechanically tamped in approximately 6-inch layers to obtain a compaction of 95 percent density as measured by the modified Procter Test. The remaining backfill shall be Class II (dense graded aggregate) material mechanically tamped to the compaction as required above for Class I material. The trench may be left with a slight mound if permitted by the Engineer. Where required by state or local regulations, a bituminous binder coarse detailed on the Drawings and specified in Section 02510 shall be incorporated in the final backfill.
3. Earth and Class I material used in final backfill is not a separate pay item. Payment shall be included in the price of gravity sewer and force main.
4. Class II material used in final backfill shall be included in the unit price for gravity sewer and force main.

- C. A sufficient amount of Class II material shall be stockpiled to insure immediate replacement by the Contractor of any settled areas. No extra payment will be made for the filling in of settled or washed areas by the Contractor.

## SECTION 02505 - CRUSHED STONE PAVING

### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

Crushed stone paving course, compacted.

#### 1.02 REFERENCES

ASTM C33 - Aggregate for Concrete.

#### 1.03 TESTS

Gradation of stone materials will be performed in accordance with ASTM C33.

### PART 2 - PRODUCTS

#### 2.01 MATERIALS

Crushed stone shall conform to ASTM C33, Type No. 57, Type No. 2, and No. 610.

### PART 3 - EXECUTION

#### 3.01 INSPECTION

- A. Verify compacted subgrade.
- B. Verify gradients and elevations of base are correct.
- C. Beginning of installation means acceptance of existing conditions.

#### 3.02 PLACING STONE PAVING

- A. Spread stone material over prepared base to a total compacted thickness of 12 inches.
- B. Place stone in 6-inch layers and compact.
- C. Level surfaces to elevations and gradients indicated.
- D. Add small quantities of sand to stone mix as appropriate to assist compaction.
- E. Adequately compact placed stone materials.

## SECTION 02610 – WATER PIPE AND FITTINGS

### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

The Contractor shall furnish all labor, material, and equipment necessary to install water main piping together with all appurtenances as shown and detailed on the Drawings and specified herein.

#### 1.02 RELATED WORK

- A. Section 02222 - Excavation.
- B. Section 02223 – Embankments.
- C. Section 02225 - Excavating, Backfilling and Compacting for Utilities.
- D. Section 02640 - Water Valves and Gates.
- E. Section 02675 - Disinfection of Potable Water Pipe.

#### 1.03 REFERENCES

- A. AWWA C104.
- AWWA C110.
- AWWA C111.
- AWWA C115.
- AWWA C150.
- AWWA C151.
- AWWA C153.
- ASTM C443.
- ASTM C478.
- ASTM D1785.

accordance with ANSI/AWWA C104/A21.4. Asphaltic outside coating shall be in accordance with ANSI/AWWA C151/A21.51 for pipe and ANSI/AWWA C110/A21.10 for fittings.

- G. All ductile fittings shall be rated at 250 psi water working pressure plus water hammer. Ductile iron fittings shall be ductile cast-iron grade 70-50-05 per ANSI/AWWA C110/A21.10.
- H. No separate pay item has been established for fittings and no determination of the number of fittings required on the job has been made. The Contractor, during the bidding phase, shall determine the number of fittings required on the job and include the cost of the fittings and installation in the unit price for pipe.
- I. Restrained joint pipe and push-on fittings shall be a boltless system equal to "Fast-Grip" restraining gaskets or "Flex-Ring" joint as manufactured by American Cast Iron Pipe Company, or "Field-Lok" restraining gaskets or "TRFLEX Joint" as manufactured by US Pipe & Foundry Company, or equal.
- J. Ball and socket restrained joint pipe and fittings shall be a boltless system equal to USIFLEX manufactured by U.S. Pipe and Foundry Company or FLEX-LOK manufactured by American Cast Iron Pipe Company. Pipe shall have a working pressure rating of 250 psi and have a maximum joint deflection of 15 degrees. Nominal laying lengths shall be in the range of 18-feet 6-inches to 20-feet 6-inches.
- K. Pipe shall be as manufactured by U.S. Pipe & Foundry Company, American Cast Iron Pipe Company, or equal.

## 2.02 POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS

- A. Polyvinyl chloride (PVC) pipe for buried water mains smaller than 4-inches in diameter shall be Class 250 (SDR 17) PVC pressure rated pipe with either twin gasket joints or integral bell joints with rubber O-ring seals. All Class 250 pipe shall meet the requirement of SDR 17.
- B. All PVC pipe shall conform to the latest revisions of ASTM D-1784 (PVC Compounds), ASTM D-2241 (PVC Plastic Pipe, SDR), and ASTM D-2672 (Bell-end PVC Pipe). PVC pipe shall have a minimum cell classification of 12454B or 12454C as defined in ASTM D-1784. Rubber gasketed joints shall conform to ASTM D-3139. The gaskets for the PVC pipe joint shall conform to ASTM F-477 and D-1869.
- C. Rubber gasket joints shall provide adequate expansion to allow for a 50 degree change in temperature on one length of pipe. Lubrication for rubber connected couplings shall be water soluble, non-toxic, be non-objectionable in taste and odor and have no deteriorating affect on the PVC or rubber gaskets and shall be as supplied by the pipe manufacturer.

taken not to disturb the grade or line of either pipe or damage the joints.

- D. Concrete for this Work is not a separate pay item and will be considered incidental to utility pipe installation.

### 3.03 PIPE LAYING

- A. All pipe shall be laid with ends abutting and true to the lines and grades indicated on the plans. Pipe shall be fitted and matched so that when laid in the Work, it will provide a smooth and uniform invert. Supporting of pipe shall be as set out in Section 02225 and in no case shall the supporting of pipe on blocks be permitted.
- B. Before each piece of pipe is lowered into the trench, it shall be thoroughly swabbed out to ensure it is clean. Any piece of pipe or fitting which is known to be defective shall not be laid or placed in the lines. If any defective pipe or fittings shall be discovered after the pipe is laid, it shall be removed and replaced with a satisfactory pipe or fitting without additional charge. In case a length of pipe is cut to fit in a line, it shall be so cut as to leave a smooth end at right angles to the longitudinal axis of the pipe. Bevel can be made with hand or power tools.
- C. The interior of the pipe, as the Work progresses, shall be cleaned of dirt, jointing materials, and superfluous materials of every description. When laying of pipe is stopped for any reason, the exposed end of such pipe shall be closed with a plywood plug fitted so as to exclude earth or other material and precautions taken to prevent floatation of pipe by runoff into trench.
- D. Anchorage of Bends:
  - 1. At all tees, plugs, caps and bends of 11 ¼ degrees and over, and at reducers or in fittings where changes in pipe diameter occur, movement shall be prevented by using suitable harness, thrust blocks or ballast. Thrust blocks shall be as shown on the Drawings, with sufficient volumes of concrete being provided; however, care shall be taken to leave weep holes unobstructed and allow for future tightening of all nearby joints. Unless otherwise directed by the Engineer, thrust blocks shall be placed so that pipe and fitting joints will be accessible for repair.
  - 2. Bridles, harness or pipe ballasting shall meet with the approval of the Engineer. Steel rods and clamps shall be stainless steel. No extra pay shall be allowed for work to provide proper anchorage of pipe, fittings or other appurtenances. Such items shall be included in the price bid for the supported item.
- E. No backfilling (except for securing pipe in place) over pipe will be allowed until the Engineer has the opportunity to make an inspection of the joints, alignment and grade in the section laid, but such inspection shall not relieve the Contractor of further liability in case of defective joints, misalignment caused by backfilling and other such

water. The leakage shall be less than an allowable amount determined by guidelines listed in AWWA Manual of Water Supply Practices "PVC PIPE--DESIGN AND INSTALLATION", or appropriate guidelines for other pipe materials. For PVC pipe, the following equation applies:

$$L = \frac{N * D * P^{0.5}}{7400}$$

Where: L = allowable leakage (gallons/hour)  
N = number of joints in the length of pipelines  
D = nominal diameter of pipe (inches)  
P = average pressure during the leakage test (psig)

- G. Should the sections under test fail to meet the requirements, the Contractor shall do all work of locating and repairing the leaks and retesting as the Engineer may require without additional compensation. All visible leaks are to be repaired regardless of the amount of leakage.
- H. If in the judgement of the Engineer, it is impracticable to follow the foregoing procedures for any reason, modifications in the procedures shall be made as required and as acceptable to the Engineer, but in any event, the Contractor shall be responsible for the ultimate tightness of the line within the above test requirements.

### 3.06 PLACEMENT OF IDENTIFICATION TAPE

The placement of detectable underground mylar marking tape shall be installed over all water mains as specified in Section 02225.

END OF SECTION 02610

32	0.500	0.469
34 & 36	0.500	0.500
42	0.625	0.625
48	0.625	0.625

- B. Weldings of the steel casing pipe shall be solidly butt-welded with a smooth non-obstructing joint inside and conform to all specifications as required by American Welding Society (AWS). The casing pipe shall be installed without bends. All welders and welding operators shall be qualified as prescribed by AWS requirements.
- C. The material shall conform to the chemical and mechanical requirements of the latest revision of ASTM A139 "Electric-Fusion (ARC) - Welded Steel Pipe (NPS 4 and Over)," unless otherwise stated herein.
- D. Grade B steel shall be used. The steel shall be new and previously unused.
- E. Hydrostatic testing shall not be necessary.
- F. The wall thickness at any point shall be within 0.025 inches of the nominal metal thickness specified.
- G. A protective coating shall be applied to each length of pipe. Following an SSPC SP-7 "Brush-Off Blast Cleaning" surface preparation, 3 (dry) mils of Tnemec-Primer 10-99 (red), or of an approved equal shall be applied in the manner recommended by the respective paint manufacturer.
- H. Each length of pipe shall be legibly marked, stating: manufacturer, diameter, wall thickness and primer.
- I. Precaution shall be taken to avoid deforming the pipe and damaging the primer during shipping.
- J. Pipe shall be within the following tolerances:

Straightness      1/4 -- 3/8.  
Roundness 1 Percent.  
Thickness 12 1/2 Percent.

**PART 3 - EXECUTION**

**3.01      INSTALLATION**

- A. Where shown on the Drawings, the Contractor shall install encasement pipe. Two methods of installation are designated, the open-cut method and the boring method.

in accordance with manufacture's recommendations.

### 3.02 SEALING

After installation of the carrier pipe within the encasement pipe, the ends of the casing shall be sealed in the following manner. The space between the casing and the carrier pipe shall be filled with a waterproofing bitumastic compound until a tight seal is obtained. An Ethylene Propylene Diene Monomer (EPDM) elastomeric membrane shall be wrapped around the end of the encasement pipe in three layers and securely bound to the casing and the carrier pipe barrel with stainless steel bands. The EPDM membrane shall be 0.045 inches thick and have a tear resistance of 125 pounds/inches. The membrane shall be manufactured by Carlisle Tire & Rubber Company, Firestone Industrial Products Company, or approved equal. The casing sealant should be constructed to allow drainage of liquid (water).

### 3.03 DAMAGE

The cost of repairing damage that is caused by the boring operation to the highway or railroad shall be borne by the Contractor.

END OF SECTION 02630

- B. Gate valves for buried service shall be furnished with mechanical joint end connections, unless otherwise shown on the Drawings or specified herein. The end connection shall be suitable to receive ductile iron or PVC pipe.
- C. Gate valves for meter pits, pump stations, or other installations as shown on the Drawings shall be furnished with flanged joint and connections, outside screw and yoke and handwheel operator. The gate valve shall have the direction of opening cast on the rim of the handwheel and provided with chain and lock.
- D. All gate valves shall have the name or monogram of the manufacturer, the year the valve casting was made, the size of the valve, and the working pressure cast on the body of the valve.
- E. Buried service gate valves shall be provided with a 2-inch square operating nut and shall be opened by turning to the left (counterclockwise).
- F. Buried service gate valves shall be installed in a vertical position with valve box as detailed on the Drawings. They shall be set vertically and properly adjusted so that the cover will be in the same plane as the finished surface of the ground or street.
- G. Valves 4-inch and larger shall be model A-2630 as manufactured by Mueller, or equal. Valves smaller than 4-inch shall be model A-2630-8 (threaded) as manufactured by Mueller, or equal.

## 2.02 CHECK VALVES

### A. General:

Check valves shall be all iron body, bronze mounted, full opening swing type. Valve clapper shall swing completely clear of the waterway when valve is full open, permitting a "full flow" through the valve equal to the nominal pipe diameter. They shall comply with AWWA Standard C-508 latest revision. The valves shall be M & H Valve Company, Anniston, AL, Valve Type 159-Lever Weight, or equal.

### B. Rating

Check valves shall be rated at 175 psi water working pressure, 350 psi hydrostatic test for structural soundness (2-inch through 12-inch) and 150 psi water working pressure and 300 psi hydrostatic test (sizes 14-inch through 30-inch). Seat tightness at rated working pressure shall be in accordance with valves shown in AWWA Standard C-500 for gate valves and fully conform to AWWA C508.

### C. End Configurations:

the filling of a system and allows air to re-enter during draining or when a vacuum occurs. The over-all height less back wash accessories shall not exceed 21 inches. Valves shall be constructed of cast iron body and cover, stainless trim and float with Buna-N seat for positive seating.

- E. The baffle shall be ductile iron and shall protect float from direct impact of air and water. The seat shall slip fit into the baffle or cover and lock in place without any distortion. The float and baffle assembly shall be shrouded with a water diffuser. The float shall be stainless steel center guided for positive seating and be rated at 1000 psi non-shock service.
- F. The discharge orifice shall be fitted with a double-acting throttle device to regulate and restrict air venting.
- G. All parts of the valves and the opening mechanisms shall be made of non-corrodible materials.

## 2.04 TAPPING VALVES AND TAPPING SLEEVES AND CROSSES

### A. Tapping Valves

- 1. Tapping valves for use with tapping sleeve and crosses shall be in accordance with the specifications for gate valves, except that one end shall have a flanged connection and the other end either a hub or mechanical joint connection.
- 2. Valves shall be rated for 250 psi in sizes 2 inch thru 24-inch.
- 3. Valves shall open by turning counterclockwise.
- 4. Inlet flanges of valves shall meet ANSI B16.1, Class 125 standard.

### B. Tapping Sleeves and Tapping Crosses

- 1. Tapping sleeves and tapping crosses shall have heavy cross sections to strengthen the existing water main at the point of installation.
- 2. Mainline end connections to existing pipeline shall be mechanical joint with large and small gaskets.
- 3. Mechanical joint tapping sleeves and crosses shall have a maximum working pressure of 250 psi.
- 4. Outlet end of tapping sleeves and crosses shall have ANSI B16.1, Class 125 flanges.

### C. Quality Standard

- 1. For full body tapping valves, tapping sleeves and tapping crosses shall be model T-2360-16 with Tapping Sleeve H-615 as manufactured by Mueller Company, or equal.
- 2. Saddles for tapping branch lines smaller than 4-inch shall be Smith Blair Series 313 or Mueller BR 2 B Series.

1. All post type fire hydrants shall have the features, and be equal to those of Mueller Super Centerion 250 A-423.

## 2.04 VALVE BOXES

- A. Each buried stop and valve shall be provided with a suitable valve box equivalent to the OWNER'S standard valve box. Boxes shall be of the adjustable, telescoping, heavy-pattern type with the lower part of cast iron and the upper part of steel or cast iron. They shall be so designed and constructed as to prevent the direct transmission of traffic loads to the pipe or valve.
- B. The upper or sliding section of the box shall be provided with a flange having sufficient bearing area to prevent undue settling. The lower section of the box shall be designed to enclose the operating nut and stuffing box of the valve and rest on the valve bonnet.
- C. The boxes shall be adjustable through at least 6 inches vertically without reduction of the lap between sections to less than 4 inches.
- D. The inside diameter of boxes for valves shall be at least 4-1/2 inch, and the lengths shall be as necessary for the depths of the valves or stops with which the boxes are to be used.
- E. Covers for valves shall be close fitting and substantially dirt-tight.
- F. The top of the cover shall be close flush with the top of the box rim. An arrow and the word OPEN to indicate the direction of turning to open the valve shall be cast in the top of the valve covers.

## 2.04 MISCELLANEOUS STOPS AND SERVICE COUPLINGS

### A. Corporation Stops

1. Corporation stops to be used with threaded pipe where connected into cast iron pipe, shall be brass ground joint type with AWWA CC or CS taper thread inlets. Stops shall be F1000-3-Q, as manufactured by Ford Meter Box Company, Inc., or equal.
2. Corporation stops to be used with copper pipe with compression type connections, where connected into cast iron or asbestos-cement pipe, shall be the same, except with compression type outlet connections.
3. Corporation stops shall be factory tested to 250 psi to be compatible with the pipes in which they are installed.
4. Quick joint couplings for 3/4" copper or plastics tubing shall be C44-33Q as manufactured by Ford Meter Box Company, Inc., or equal.

## 2.05 PRESSURE GAUGES

valves and sluice gates and their wall thimble.

- I. Wall thimbles shall be accurately set in the concrete walls so that the gates can be mounted in their respective positions without distortion or strain.
- J. Floorstand operators and stem guides shall be set so that the stems shall run smoothly in true alignment. Guides shall be anchored firmly to the walls. Distances from the centerlines of gates to the operating level or base of floorstand shall be checked by the Contractor and adjusted if necessary to suit the actual conditions of installation.

### 3.02 PAINTING

- A. Valves shall be factory primed and fully coated, inside and out, with fusion bonded epoxy in accordance with the latest revision of AWWA C550 Standard.
- B. Other painting (if required) is specified in Division 9.

END OF SECTION 02640

## SECTION 02930 - SEEDING AND SODDING

### PART 1 - WORK INCLUDED

#### 1.01 CLEAN-UP

Upon completion of the Project, the Contractor shall remove all debris and surplus construction materials resulting from his work. The Contractor shall grade the ground along each side of the pipe trenches and/or structures in a uniform and neat manner leaving the construction area in a shape as near as possible to the original ground line, or as shown on the Drawings.

### PART 2 - PRODUCTS

#### 2.01 SEED

Grass seed shall be mixed and guaranteed by the supplier to consist of the following:

Annual Rye	60 percent
Kentucky Bluegrass	20 percent
Falcon Fescue	20 percent

#### 2.02 TOPSOIL

Topsoil shall be material stripped and stored under work of Section 02200 and shall be used for all work under this Section. If the quantity of stored topsoil is inadequate or if none has been salvaged from the Project site, the Contractor shall furnish at his own expense sufficient topsoil to properly install all work as specified herein. Topsoil shall be original surface loam obtained from well drained areas from which topsoil has not been removed previously, either by erosion, clearing and removal of trees or mechanical means. It shall not contain subsoil material and shall be clean and free of clay lumps, roots, stones or similar substances more than 2 inches in any dimension, debris, discarded fragments of building materials or weeds and weed seeds.

#### 2.03 SOIL IMPROVEMENTS

- A. Commercial fertilizers shall be of analyses specified, or as recommended by the Agricultural Extension Service for treatment of topsoil in the area from which removed, and shall conform to the applicable state fertilizer laws. Fertilizer shall be uniform in composition, dry and free flowing, and shall be delivered to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Any fertilizer which becomes caked or otherwise damaged, making it unsuitable for use, will not be accepted.

- G. The Contractor shall remove from the site all equipment, unused materials and other items at his expense. The construction site shall be left in a neat, orderly condition, clear of all unsightly items, before the Work is finally accepted.

END OF SECTION 02930

**COMMONWEALTH OF KENTUCKY  
BEFORE THE PUBLIC SERVICE COMMISSION**

IN MATTTTER OF:

Case No:  
2014-00306

Beech Grove Water System, Inc.

**\*\* \*\*\* \*\*\*\*\* \*\***  
**CERTIFICATION OF RESPONSE TO COMMISSION**  
**STAFF'S FIRST INFORMATION REQUEST**  
**\*\* \*\*\* \*\*\*\*\* \*\***

This is to certify that I have supervised the preparation of the Applicant's Response to the Commission Staffs First Information Request. The responses submitted on behalf of Beech Grove Water System are true and accurate to the best of my knowledge, information, and belief formed after a reasonable inquiry.

Date: May 6, 2016



**Nathan Ward  
President**

Prepared By  
Sheila Murphy

# BEECH GROVE WATER SYSTEM

## Meeting

January 19, 2016

Beech Grove Fire Dept.

445 Hwy 56 N Calhoun KY 42327

Present were President Jeremy Rager, Greg Cheatham, Chad McMahon, Nathan Ward, Michael Wahl and Sheila Murphy.

President Jeremy Rager declared that a quorum was present and called the meeting to order.

The minutes & financial report of the Dec, 2015 meeting were reviewed. Motion was made by Nathan and seconded by Chad to approve the minutes & financial report as prepared. Motion carried unanimously.

### Old Business

Deron Hawkins (EMCOR) came in to talk with the board about the meter reading system. Deron explained that he will resubmit the plans to the PSC. This proposal will include a drive by system as well as the auto mesh reading system. Deron will revise the cost of both unit and bring it back to the water board.

There was discussion with water board that they will look at cost of each system. Chad request that we go to a water system that uses this type of system to see how it works. Deron agree to take the board to a one of the water systems using drive by water systems.

The board discussed the cost sent to us by (GRADD) Joann Shake about the cost of new storage tank near the coal mines. It was determined that it was too costly without some type of grant.

### New Business

The board discussed pressure problem on Wrightsburg Hill and agreed that the specifications by Allen Robinson with Eclipse Engineers was a better way to boost the pressure for the 4 homes with low pressure.

There was a motion by Greg to send the engineering plans to the PSC & Div of Water. Chad 2<sup>nd</sup> the motion, and carried unanimously.

### ADJOURNMENT

There being no further business to come before the water board, motion was made by Nathan and seconded Greg to adjourn the meeting. Motion carried unanimously.



**2014-0306**

**CONTAINS**

**LARGE OR OVERSIZED**

**MAPS**

**RECEIVED ON:**

**May 12<sup>th</sup>, 2016**